ELECTRICAL WEST

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APPLIANCES PAGE 71

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of California

DECEMBER 1946

25c a Copy

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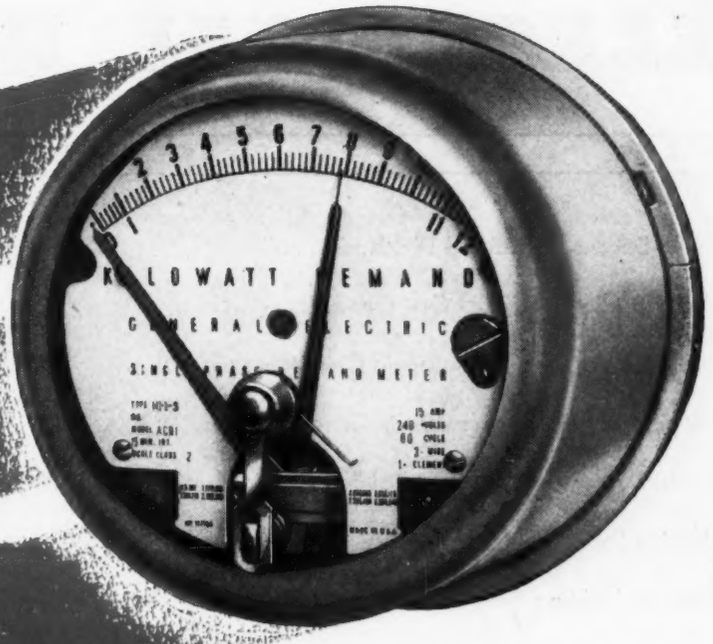
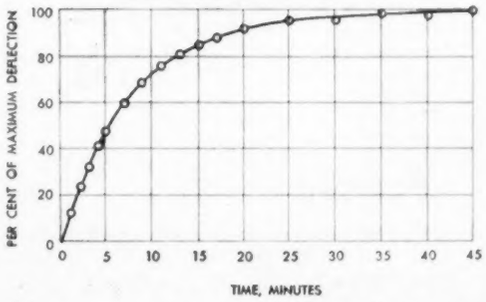
New! THERMAL WATT-DEMAND METER



. . . . . with IDEAL response-time characteristics

- MAXIMUM EFFICIENCY
- INHERENT ACCURACY
- TRUE EXPONENTIAL CURVE
- PREDICTABLE CHARACTERISTICS

NEW G-E THERMAL DEMAND METER FOLLOWS TRUE EXPONENTIAL CURVE



Time of response, Type HI-1 rated 240 volts, 47.7 amperes, 1.0 power factor, 11.4 kilowatts, 25 C

THE FIRST IN A FAMILY OF G-E THERMAL DEMAND METERS

● The new G-E thermal watt-demand meter has ideal response-time characteristics because it is built upon a radically different and unique design, the "direct-heat" principle. Since the current passes directly through the bi-metallic spirals, they serve not only as temperature-sensitive elements, but also as their own electrical-resistance heaters, thus giving maximum heat efficiency.

● The resulting lack of over-shoot — the tendency of the pointer to advance after the current has been removed—and the lack of necessity for compensation assure a meter with initial and sustained accuracy.

● The "direct-heat" principle, moreover, since it is not dependent upon heat transfer, results in operation based on the true law of heating, mathematically expressed in the exponential curve.

● Since the characteristics of the meter can be expressed as a well-known curve, its results are predictable and mathematically definable. Such a meter obviously suggests the possibility of quick calibration and test.

For complete information on this new development in the art of meter design, write today for "Thermal Watt-demand Meters," Bulletin GEA-4541. *Apparatus Department, General Electric Company, Schenectady 5, New York.*

HEADQUARTERS FOR MEASUREMENTS

GENERAL ELECTRIC

ELECTRICAL WEST

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Cover Photo. Lamping up Santa Claus Lane, more than a mile of outdoor modernistic Christmas trees mounted over the street light standards of Hollywood Blvd., supplemented by stars and spun aluminum bells over the street; a total of 630 kw. connected.

CHANGE OF ADDRESS

Circulation Manager,
Electrical West,
68 Post St.
San Francisco, Calif.

Please change my address

From .....

To .....

Signed .....

People

John J. Fiske

who is writing on maintenance of electronic equipment these days (his article this month is on page 56) is one of those rare cases—a resident of Hollywood who was born in California. He may in fact be regarded as having special standing among native Californians, as he can claim past residence in a variety of its storied spots, including San Francisco, where he was born, the gold mining country, where he went to high school, and Berkeley, where he went to college. After graduating in engineering, he joined Westinghouse at East Pittsburgh, Pa., in 1941. While in Pennsylvania he got married and completed graduate engineering work at the University of Pittsburgh. In 1943 he was transferred to Westinghouse' Los Angeles office as electronic control specialist.

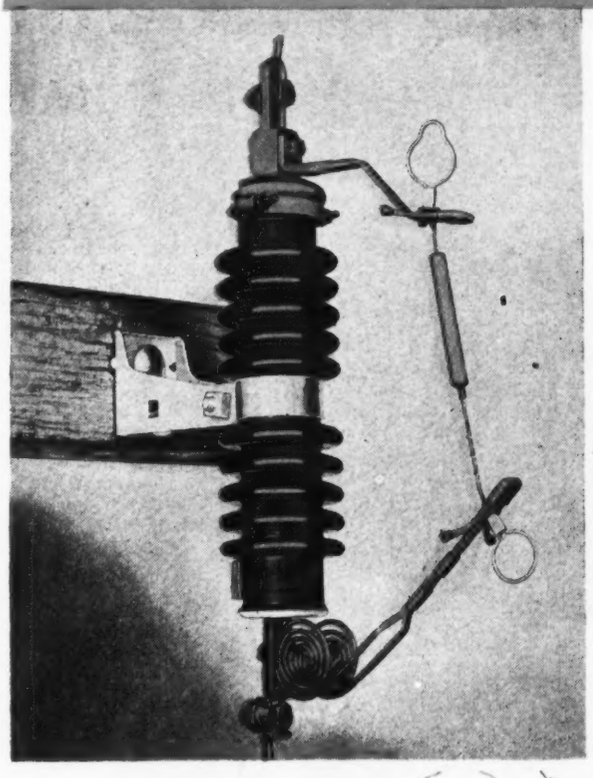
M. L. Gordon

is supervisor in the new service unit of Los Angeles Department of Water & Power's business agent's division, and in that capacity contacts the numerous business communities which light up for Christmas season. He is therefore in position to summarize what this means in kilowatts connected and consumption, as he does on page 76. Of course the job in Hollywood is the most elaborate.

Preview

You'll find some fascinating reading next month in the story of the research of H. L. Logan. Even if your interest in lighting is confined to your own home you'll want to know these facts, although it's really a story for lighting men. Based on his papers presented to the IES, this story builds up a principle for interior lighting design which looks at the problem as the human eye looks at it. What is the human eye *supposed* to look at? That question is answered. How do the results of this method compare with those of methods now standard in illuminating practice? That question is answered too.

Better Construction Today—*Less* Maintenance Tomorrow

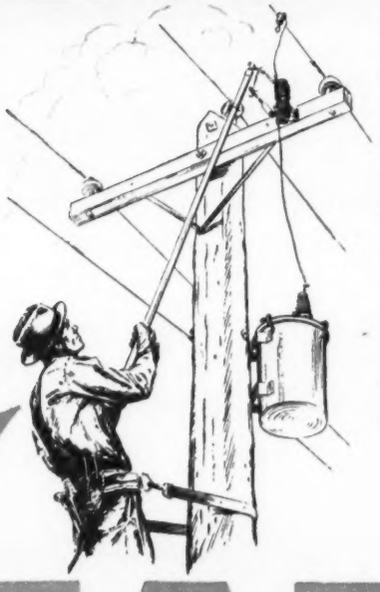


REPLACING FUSES IS EASY

When You Use Dependable KEARNEY TRIP-O-LINKS

THE single unit link and cartridge is quickly and easily installed in the double wedge grips of the Trip-O-Link switch. Positive arc interruption is assured because there is a new fibre cartridge with each replacement.

The unique design of this low cost switch assures positive link separation with exceptionally high interrupting capacity. Available in 50 and 100 ampere sizes, single shot and two shot reclosing types.



Specify

KEARNEY PRODUCTS

MAYDWELL & HARTZELL
INCORPORATED
LOS ANGELES • SAN FRANCISCO • PORTLAND

Announcing

The Nicopress No. 635 HYDRAULIC TOOL and SPLICING

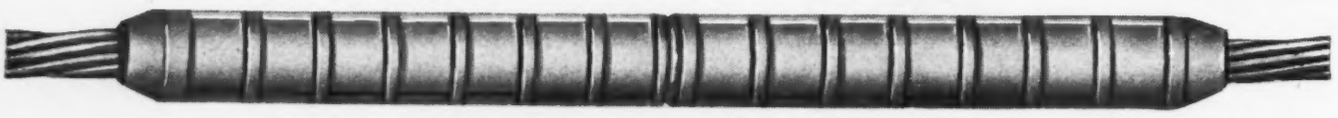
Nicopress SPLICING SLEEVES

FOR LARGE CONDUCTORS AND HIGH-STRENGTH STRANDS

**Light in weight—Holds full strength of conductor—
High in conductivity**

Completed Nicopress Splice on 4/0 Copper Conductor

**Completed Nicopress Splice on 3/8" Extra High Strength
Copperweld Strand**



**Completed Nicopress Splice on 3/8" Extra High Strength
Galvanized Steel Strand**

THE NATIONAL TELEPHONE SUPPLY COMPANY

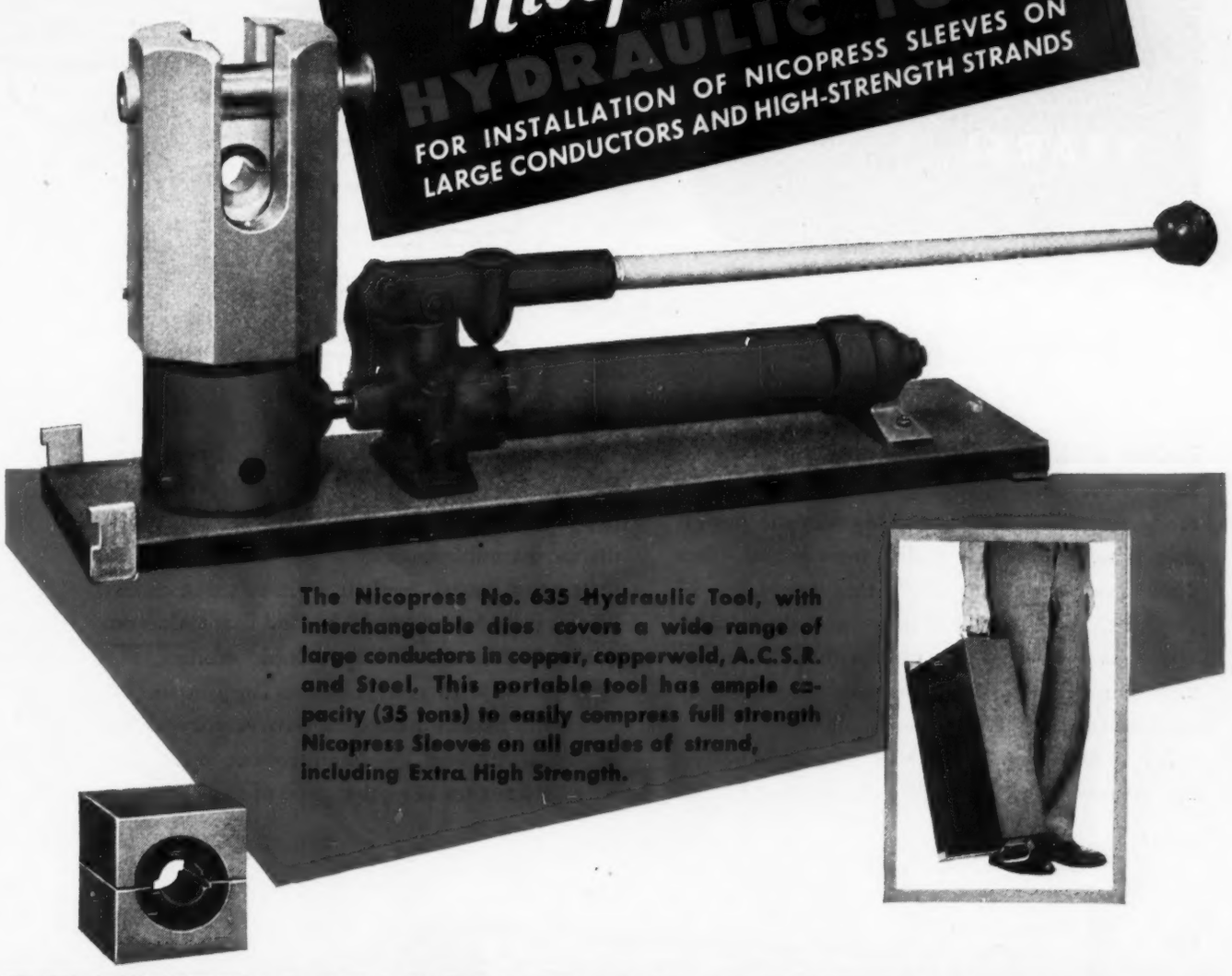
The National

5100 SUPERIOR AVENUE

Canadian Mfr.: N. SLATER CO., LTD., HAMILTON, ONTARIO, CANADA

SLEEVES for LARGE CONDUCTOR & STATIC WIRE SPLICING

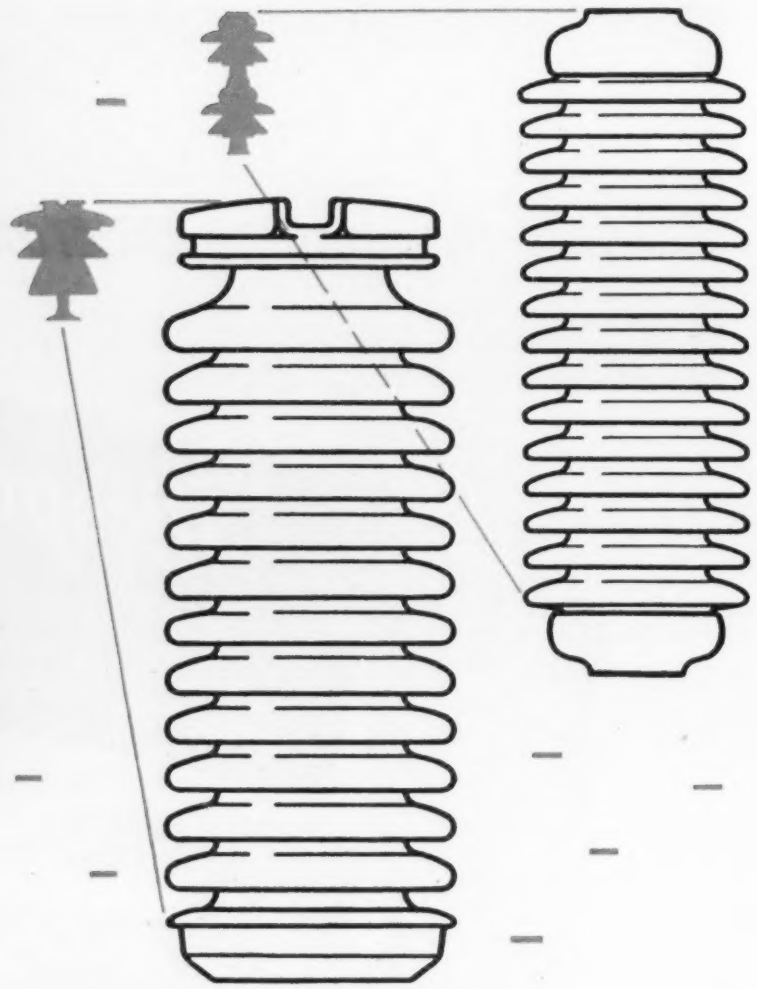
Nicopress No. 635
HYDRAULIC TOOL
FOR INSTALLATION OF NICOPRESS SLEEVES ON LARGE CONDUCTORS AND HIGH-STRENGTH STRANDS



The Nicopress No. 635 Hydraulic Tool, with interchangeable dies covers a wide range of large conductors in copper, copperweld, A.C.S.R. and Steel. This portable tool has ample capacity (35 tons) to easily compress full strength Nicopress Sleeves on all grades of strand, including Extra High Strength.

Telephone Supply Company
CLEVELAND 3, OHIO
Export Distributor: INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N.Y.

LOOK WHAT'S HAPPENED TO TRANSMISSION INSULATORS IN *15* YEARS!



Earliest claims of operating superiorities of the Lapp Post design for high voltage insulation made sweeping promises. This was the design that would eliminate radio interference, that could not puncture or crack, that would stay in service through severe arcover and mechanical attack, that would serve, even without cleaning, under atmospheric contamination that defied any conventional insulators.

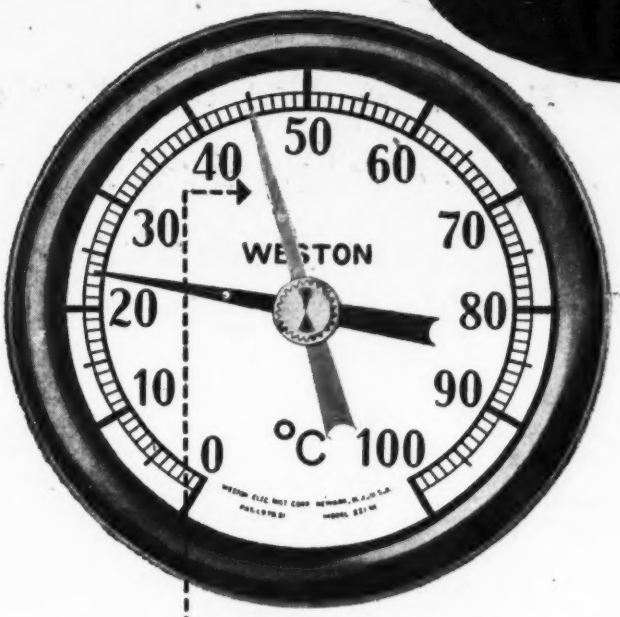
If you were skeptical about an unproved design that claimed so much, we don't blame you; a lot of engineers were. But that's more than 15 years now. For those 15 years, the Lapp Line Post and the Lapp Station Post have been proving—in many of the most troublesome spots on the transmission systems of America—their right to these claims. Theirs is a 15-year service record that makes our original claims and hopes look modest. For, through those 15 years, lines on Lapp Posts have had fewer insulator outages, have required fewer replacements and less maintenance than comparable lines on any other type of insulator.

Lapp

LAPP INSULATOR COMPANY, INC., LE ROY, NEW YORK

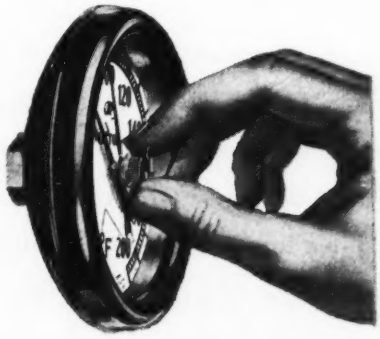
DOUBLE-duty

Weston All-Metal MAX-MIN* Thermometers



--RED INDEX

Red Index shows at a glance highest or lowest temperature reached since last setting.



Red index easily set to high or low side of thermometer pointer by turning knob.

1 MEASURE PRESENT LEVELS . . . ACCURATELY

2 INDICATE PAST LIMITS . . . FAITHFULLY

The new WESTON Max-Min thermometer not only provides continuous temperature measurement with traditional WESTON accuracy, but it also furnishes a reading of the highest or lowest temperature attained since last setting.

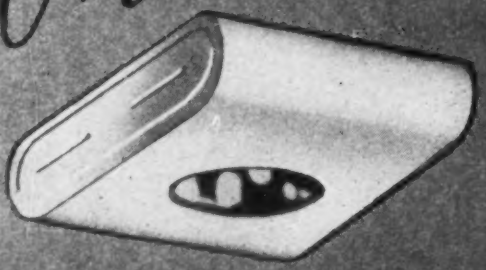
WESTON Max-Min thermometers are stocked in a variety of ranges. Model 221-M (3" head diam.) and Model 222-M (5" head diam.) are available for immediate delivery. If your jobber cannot supply you, see your local WESTON representative, or write for Thermometer Bulletin . . . Weston Electrical Instrument Corporation, 577 Frelinghuysen Avenue, Newark 5, New Jersey.

*Trademark

Weston Instruments

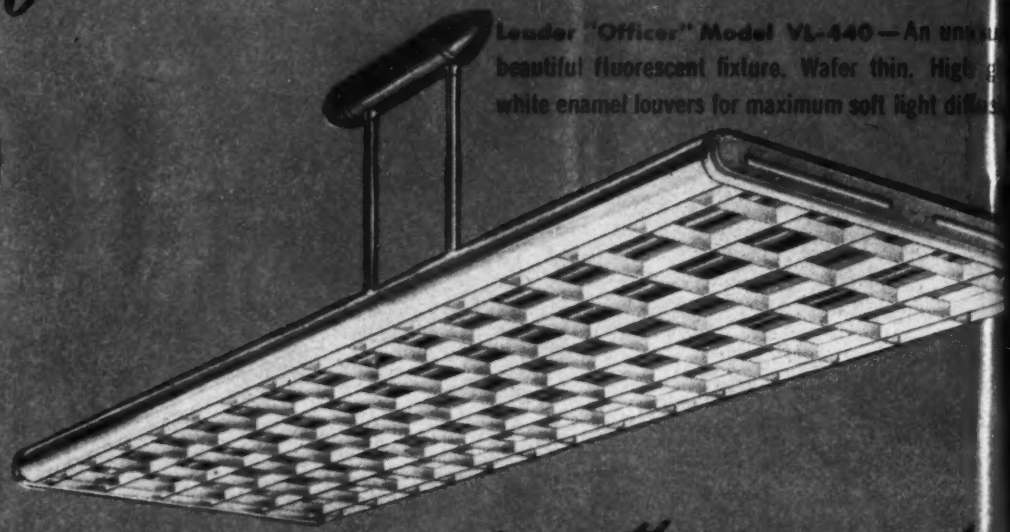
ALBANY • ATLANTA • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DENVER • DETROIT • JACKSONVILLE • KNOXVILLE • LOS ANGELES • MERIDEN • MINNEAPOLIS • NEWARK
NEW ORLEANS • NEW YORK • PHILADELPHIA • PHOENIX • PITTSBURGH • ROCHESTER • SAN FRANCISCO • SEATTLE • ST. LOUIS • SYRACUSE • IN CANADA, NORTHERN ELECTRIC CO., LTD., POWERLITE DEVICES, LTD.

A STEP AHEAD *in Modern* DESIGN...

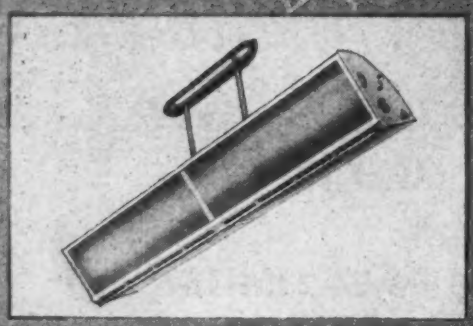


Leader Adjustable Directite — Adds a new note to modern merchandising. May be mounted above display case in a continuous run of "Officer" units . . or with a single unit . . . to spotlight merchandise for added sales appeal.

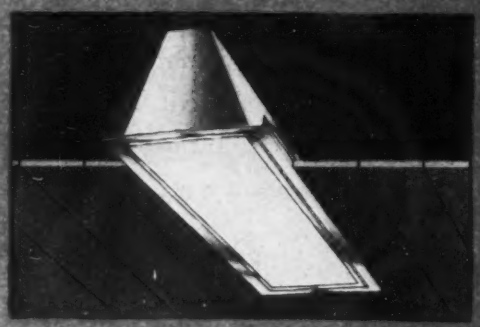
Leader "Officer" Model VL-440 — An unu... beautiful fluorescent fixture. Wafer thin. High ... white enamel louvers for maximum soft light diffu...



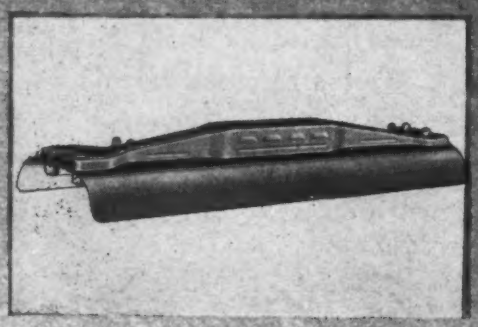
. . . gives the improved appearance that builds preference in schools, offices, factories for



Leader Glass-Enclosed Unit GL-440 — Brings luxury lighting within the reach of all! Ribbed glass construction for plenty of soft, cool light. An admirable unit for schools, stores, offices, hospitals.



Leader Trofferlite TG-240 — An ideal fixture to use on remodeling jobs or where a streamlined, modern, effect is desired. Ceiling may be hung from unit.



Leader Zephyrlite ZUO-L/240 — A light, easily installed indus... unit. Corrugated for unusual strength, will not warp, twist ... eliminates the need for installation "extras."

Leader Fluorescent Luminaires

Eye appeal . . . and lots of it . . . is one BIG reason why a constantly increasing number of architects, lighting and utility engineers, and electrical contractors now specify LEADER lighting equipment for school, institution, office and other installations.

Beautiful as they are, however, LEADER fluorescent luminaires achieve their good looks without sacrifice of lighting efficiency. Maximum "better light for better sight" is maintained by LEADER designers who combine modern styling with latest engineering and research findings.

Get acquainted with the LEADER line. There is a friendly LEADER representative in your area . . . or write for catalog direct to:

LEADER ELECTRIC MANUFACTURING CORP., 6127 N. BROADWAY, CHICAGO 40, ILL.

MANY PLANTS stock far too many *different lengths* of carbon brushes having the *same width and thickness.* Even for one type and make of motor, often several different lengths are stocked! This naturally takes up inventory space; ties up capital; makes extra handling, accounting, and ordering work—another reason why operating costs are high!

Take the first big step toward simplifying and standardizing your motor and generator brush stocks right now! Simply order only those brush lengths originally recommended for each machine.

There are also other ways to streamline your brush stocks. Watch forthcoming advertisements or write our nearest Division Office, Dept. EW, for further details.

See how Brush Standardization pays!

It's unnecessary to carry hundreds of special carbon brush sizes and types. Actually, a comparatively few standard brushes can fill most of your needs. This program of standardization of carbon, graphite, and metal-graphite brushes sponsored by National Carbon Company, Inc., will pay you—and here's how:

1. Price advantage through quantity discounts.
2. Reduction of small orders—saving time in bookkeeping, billing, and accounting.
3. Less money and space tied up in brush stocks.
4. Less time needed to handle stock.

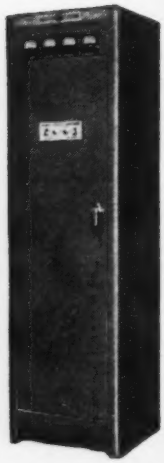
NATIONAL CARBON COMPANY, INC.

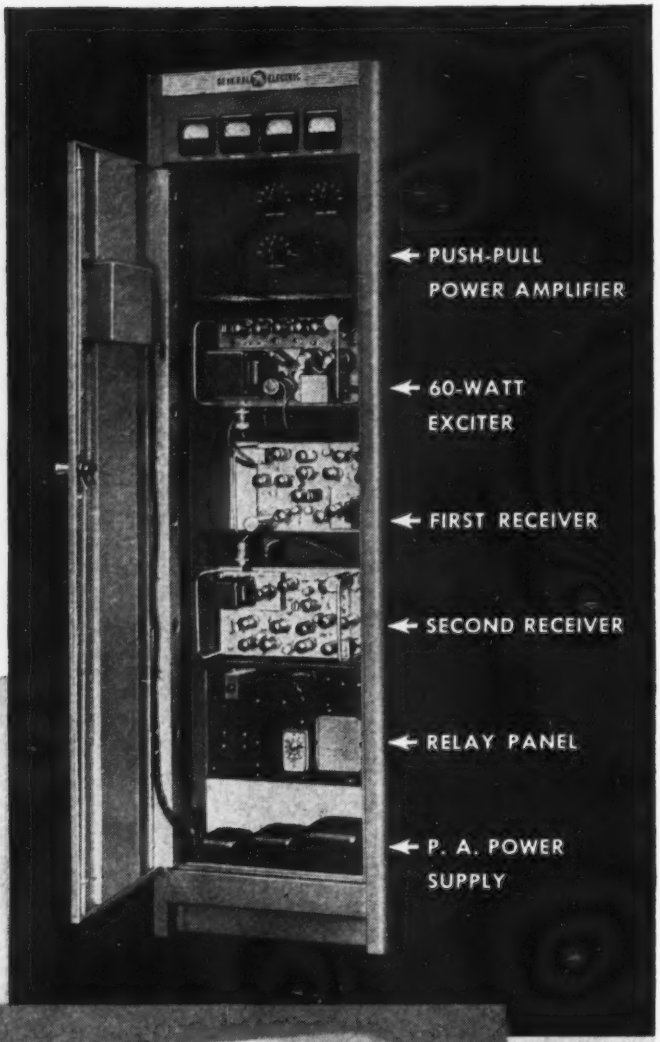
Unit of Union Carbide and Carbon Corporation
The word "National" is a registered trade-mark of National Carbon Company, Inc.

UCC

30 East 42nd Street, New York 17, N. Y.
Division Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

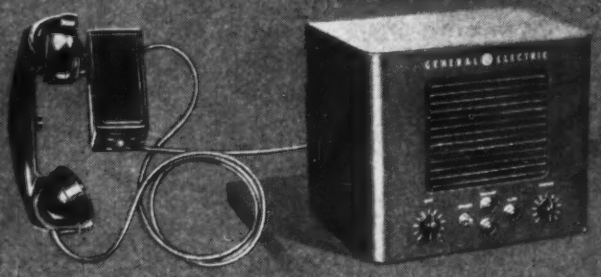
MAKE "TRAVEL TIME" WORK WITH THE G-E 250-D FM STATION COMBINATION





FIVE GOOD REASONS WHY THE G-E 250-D FM STATION COMBINATION WILL HELP YOU

- Instant Contact Means Instantaneous Results
- Gets Action—When and Where You Want It
- Avoids Costly and Dangerous Delays
- Coordinates Activities to Produce Better Teamwork
- Easy, Efficient Operation



CONVENIENT HANG-UP TYPE MICROPHONE

LOCAL CONTROL UNIT FOR THE 250-D COMBINATION

and TEN GOOD REASONS TO BUY THE G-E 250-D FM STATION COMBINATION

- Local control unit furnished for operation adjacent to the transmitter, providing greater flexibility and normal, on-the-spot operation.
- Provision for operation from a remote point over a single pair telephone line.
- Silver-plated, hermetically-sealed transmitter crystal and hermetically-sealed receiver crystal.
- Vertical construction for easier maintenance and better ventilation.
- No dangerous voltages exposed when doors are opened. Tuning can be done while the equipment is operating.
- Standard, easy-to-obtain tubes used throughout.
- All sub-chassis bases protected by easily removable dust covers.
- Heavy-gauge steel construction with opalescent-blue, baked enamel Dimenso finish. Stainless steel trim.
- Doors lock front and back with positive action handles.
- Double outlet convenience receptacle with 110 volt A. C., for servicing.

G-E radio engineers are located in principal cities. For complete information and assistance in planning your radio system, call or write your nearest General Electric office or the Electronics Department, General Electric Company, Syracuse 1, New York.

FIRST AND GREATEST NAME IN ELECTRONICS

GENERAL ELECTRIC

163-E10-6918

12 YEARS IN SALT AIR

- it's Copperweld Strand!

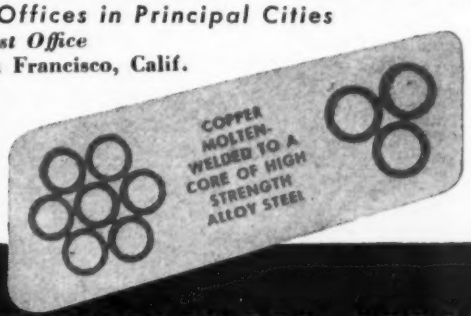
● Here's added proof of the permanence and lasting qualities of Copperweld Strand. For 12 years the corrosive action of the salt-laden atmosphere of Long Island Sound worked on this once sturdy turnbuckle and the ½ inch diameter Copperweld Strand which was attached to it.

Like creeping paralysis, rust and corrosion kept eating away until the turnbuckle failed. But notice the Copperweld Strand! With its protective covering of copper, molten-welded to alloy steel, it remains well preserved, intact and unweakened—as good today as when first installed.

You can eliminate the necessity of replacing guy and messenger strand every few years by always specifying Copperweld—the permanently strong, non-rusting strand which assures long life at low annual cost.

COPPERWELD STEEL COMPANY • Glassport, Pa.

Sales Offices in Principal Cities
Pacific Coast Office
Rialto Building, San Francisco, Calif.



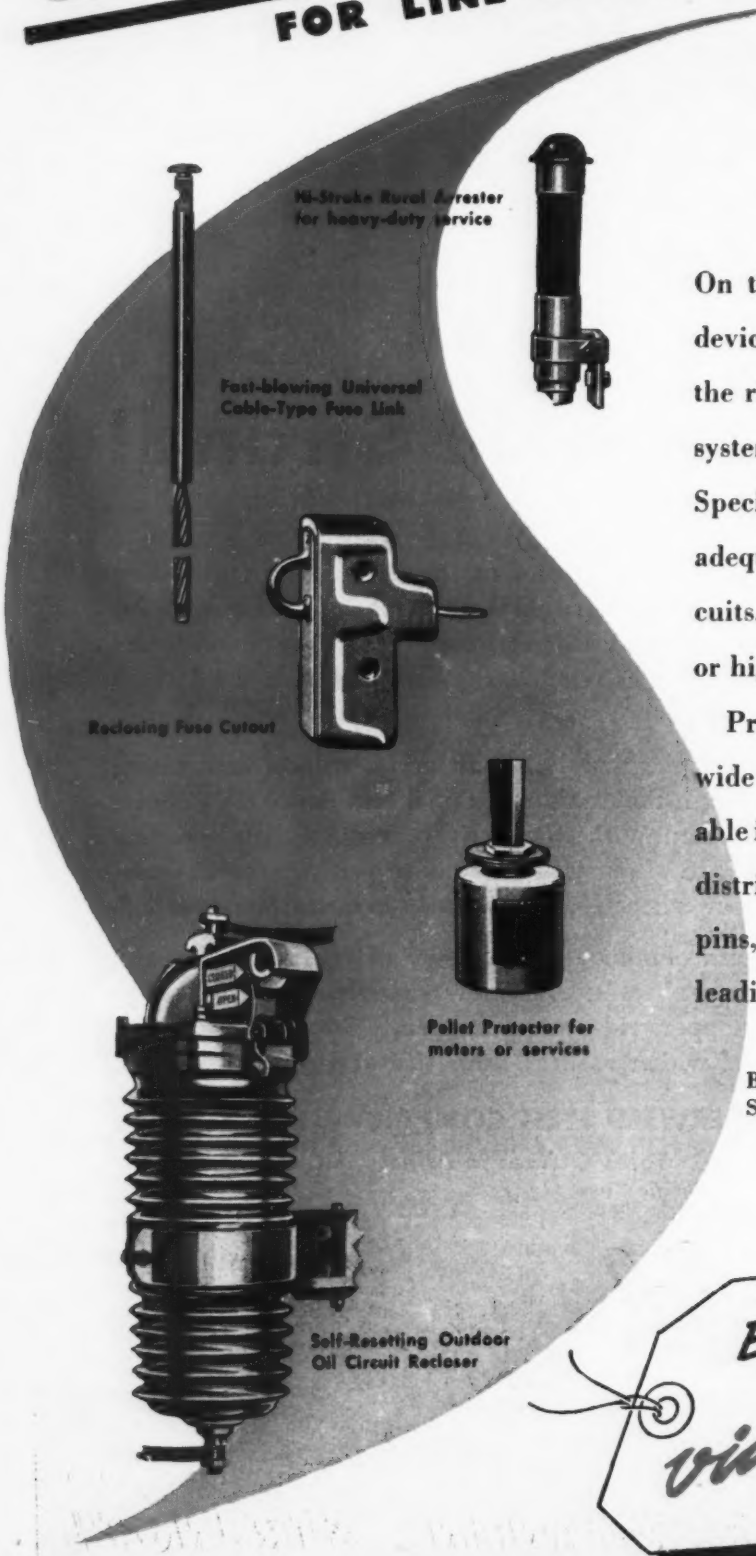
Copperweld

NON-RUSTING GUY AND MESSENGER STRAND FOR PERMANENT STRENGTH

Protection

FOR LINE APPARATUS, METERS, SERVICES

GRAYBAR DISTRIBUTES G-E PROTECTIVE DEVICES — OFFERS SPECIALIZED HELP


Hi-Stroke Rural Arrester for heavy-duty service
Fast-blowing Universal Cable-Type Fuse Link
Reclosing Fuse Cutout
Pellet Protector for meters or services
Self-Resetting Outdoor Oil Circuit Recloser

On this page you see some of the G-E protective devices which Graybar distributes. We can supply the right ones for the vital points throughout your system. The near-by Graybar Outside Construction Specialist will gladly work with you in providing adequate protection for your low-voltage power circuits, secondary and primary distribution systems, or high-tension transmission lines.

Production is gaining on demand, and our nation-wide warehousing system speeds delivery of available items. In addition to protective devices, Graybar distributes poles, crossarms, hardware, insulators, pins, strand, and tools — all first-quality products of leading manufacturers.

4688

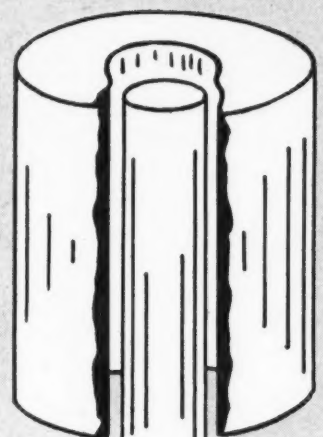
GRAYBAR ELECTRIC COMPANY
Boise, Denver, Los Angeles, Oakland, Phoenix, Portland, Sacramento, Salt Lake City, San Diego, San Francisco, Seattle, Spokane, Tacoma

IN OVER 90 PRINCIPAL CITIES

Everything for your Pole Lines via Graybar

"Feather-Touch" Control

It Helps Give You Closest Line Regulation With Allis-Chalmers 5/8% Step Regulators

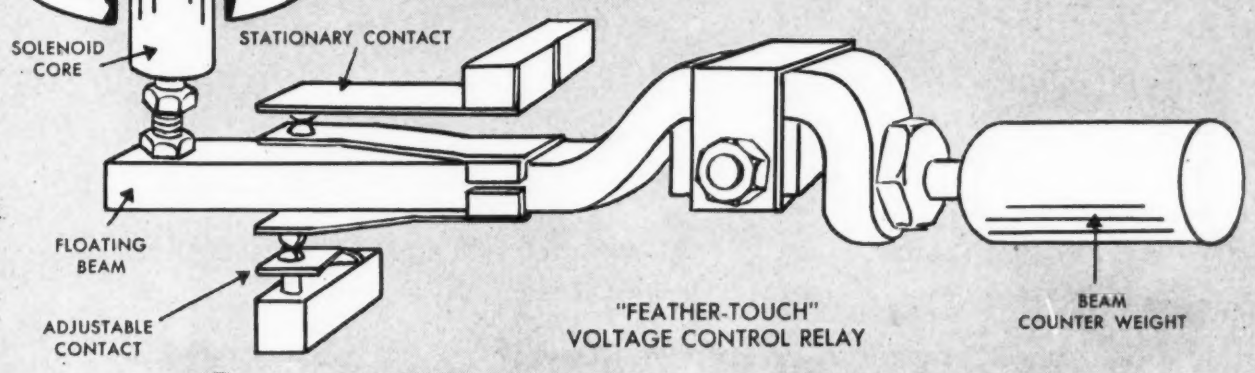


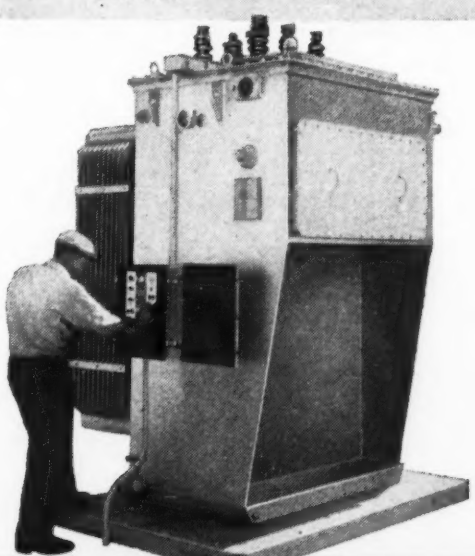
"Feather-Touch" control relay employed on A-C ⅝% Step Regulators is a prime factor in ability of regulator to hold voltage within plus-minus ¾ volt.

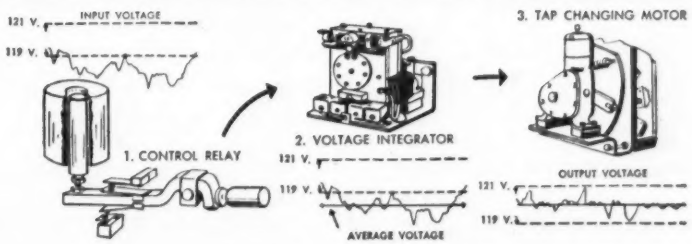
No holding coils are required. Absence of damping effect of coils means that floating beam can closely follow every fluctuation in line voltage.

No overshooting or slowed-down response in "Feather-Touch" control relay — ⅝% band width is held easily.

Combined with "voltage integrator" used in control for Allis-Chalmers ⅝% Step Regulators, the "Feather-Touch" relay makes possible the closest feeder regulation to be had today!







Control Arrangement for A-C ⅝ % Step Regulators

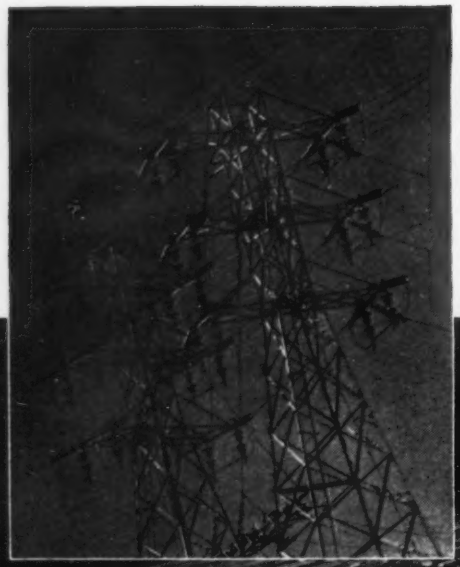
INPUT VOLTAGE fluctuations are accurately followed by "Feather-Touch" control relay, and are fed into "voltage integrator." Integrator sums up these fluctuations, and starts operation of tap-changing motor whenever average voltage is outside band setting, thus maintaining voltage at desired level. For complete description of A-C ⅝% Step Regulators, call our nearby sales office, or write directly to ALLIS-CHALMERS, MILWAUKEE, WIS.

A-2060

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment
Biggest of All in Range of Industrial Products

⅝% STEP REGULATORS



More Power
TO WESTERN INDUSTRIES

Storage yards at the Bethlehem Pacific tower-fabricating shops, South San Francisco. Shown here are fabricated-steel sections for more than 300 towers and bus structures.

Fanning out across mountains and fertile plains, multiple power lines are feeding billions of kilowatts to growing Western industries. Many hundreds of miles of these power lines are carried on Bethlehem Pacific steel transmission towers.

In the field of tower fabrication Bethlehem Pacific has long been a specialist. This single organization produces the steel, rolls the shapes, designs and fabricates the finished structures. Rolling mills at Seattle, South San Francisco and Los Angeles, fabricating shops at South San Francisco, Alameda and Los Angeles are fully coordinated to produce steelwork on any scale.

BETHLEHEM PACIFIC COAST STEEL CORPORATION
General Offices: San Francisco

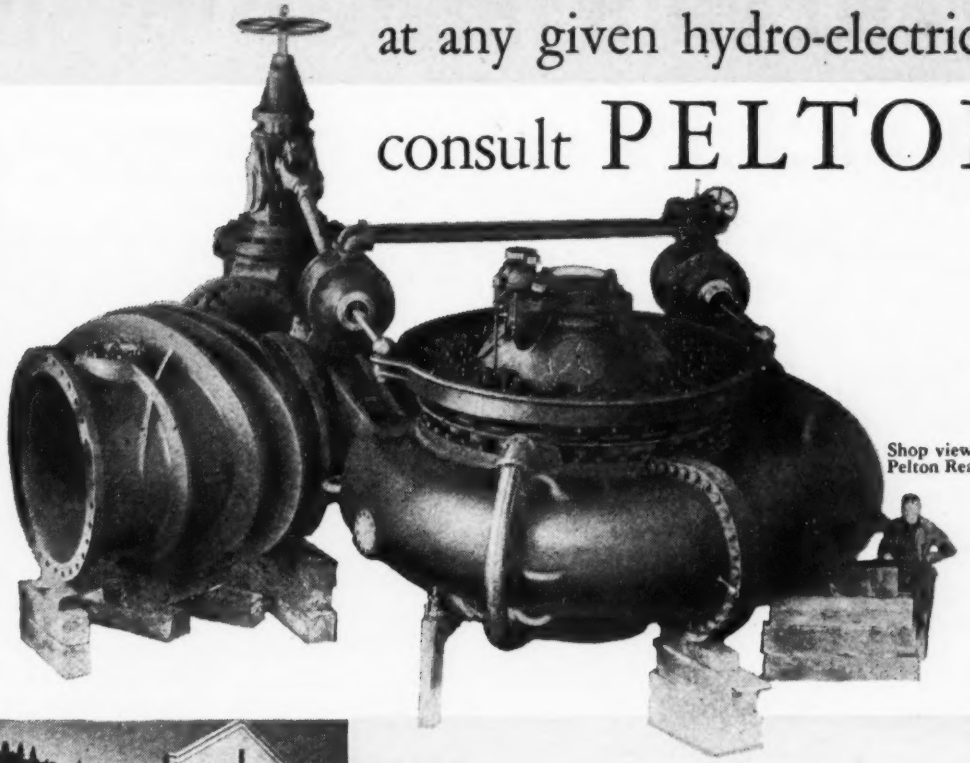
BETHLEHEM PACIFIC

★ BETHLEHEM STEEL ★

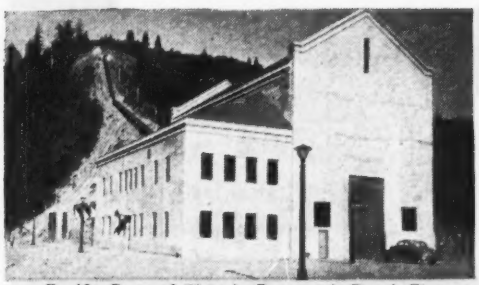
For MAXIMUM POWER DEVELOPMENT

at any given hydro-electric site . . .

consult PELTON

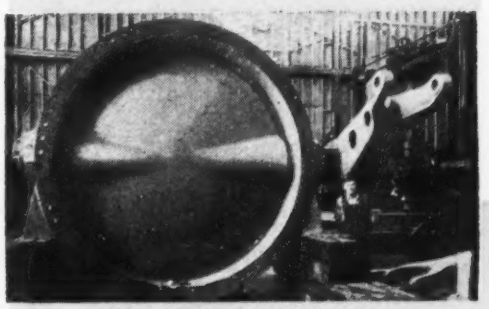


Shop view of 44,000 hp. Pelton Reaction Turbine.



Pacific Gas and Electric Company's Dutch Flat Power House in California where one 29,000 hp. Pelton Reaction Turbine is installed.

City of Tacoma's Alder Dam and Power House where two 34,500 hp. Pelton Reaction Turbines are used.



10-FOOT BUTTERFLY VALVE

Pelton has the hydraulic engineers, the long experience and the gigantic machine tools for building huge valves for penstocks carrying water to Pelton Turbines which are made in sizes up to 70,000 horsepower and more.

PELTON is COMPLETING TURBINES for use in North America, Colombia, Peru and Africa

To develop the maximum horsepower at any given hydro-electric site, Pelton engineers design the turbine for the particular water conditions.

That is why Pelton is building turbines for installation over the world.

Throughout 66 years of turbine construction, Pelton has made laboratory experiments as to the shape and contour of impulse buckets, the curvature of reaction-turbine runners, sizes, abrasives in the water and so on.

Then the Pelton organization of skilled men using modern machine tools builds the turbines and skilled engineers supervise installation and check performance.

Such accumulation of science and manufacturing experience assures purchasers that each turbine will develop the required horsepower at any given hydro-electric site. Moreover, Pelton Turbines are built *right*—to withstand long years of continuous operation free from trouble.

BLW THE BALDWIN GROUP

The PELTON WATER WHEEL Company

Subsidiary of The Baldwin Locomotive Works

2929 NINETEENTH STREET • SAN FRANCISCO 10, CALIF.

"THE CABLE WITH THE ASBESTOS SUIT"

...OKOBESTOS

Just as the man in the asbestos suit dramatically demonstrates the fire-resisting properties of asbestos, a similarly-protected cable known as Okobestos proves its value in service where high temperatures are continuously encountered.

Okobestos wires and cables are made in a wide range of designs. All are engineered by Okonite to take full advantage of the heat resistance and stability of their *impregnated felted asbestos insulation* which is also highly resistant to mechanical abuse and to corrosion. Designed for use up to 8,000 volts . . . conforming to NEMA and Underwriters' Laboratories standards, Okobestos serves, among other applications, as power cable, apparatus cable, multi-conductor control cable, flexible cords, switchboard wire and appliance wire.

In the making of Okobestos electrical-grade refined pure asbestos is felted and impregnated with flame and moisture-resisting compounds. Where required, a wall of heat-resisting varnished cambric is used as the principal dielectric element and a second wall of felted asbestos added. Over these layers, a protective covering is applied which may be a heavy asbestos braid, a cotton braid or a lead sheath.

To meet specific conditions, Okobestos wires and cables may be furnished with all-asbestos insulation and asbestos braid, with all-asbestos insulation and lead sheath, with Okoseal synthetic resin insulation and in other constructions.

Write for Bulletin OK-2061 which gives detailed descriptions of principal standard constructions and the voltages, operating temperatures and locations for which each is recommended. Address The Okonite Company, Passaic, N. J.

OKONITE OKONITE SINCE 1878 **insulated wires and cables**

4750

AVOID DANGEROUS "SINGLE PHASING"

BY USING

KYLE

AUTOMATIC THREE PHASE OIL CIRCUIT RECLOSERS

Only KYLE gives you
Dual Operating Characteristics

• Many a burned-out motor results from even a short period of "single phasing" when a permanent fault develops on one phase of a three phase system.

Kyle Type "3H" Automatic Oil Circuit Reclosers eliminate this danger. A permanent fault on any one phase will cause the Kyle Recloser to lock out automatically and disconnect service on both the other phases immediately.

Kyle Reclosers perform this vital function with the important additional feature of coordinating with fuse links to keep as great a portion of your lines as possible in service all the time.

Exclusive KYLE dual operating characteristics give:

1 Fast opening on first and second operations. This permits the automatic clearing of temporary faults without damage to sectionalizing fuses.

2 Time delay on third and fourth operations. This allows the affected fuse to blow, isolating the permanent fault, keeping main lines in service.

After the sectionalizing fuse blows, the Kyle Recloser resets itself for another cycle of operations.

For complete information on the protection for three phase lines afforded by Kyle Type "3H" Reclosers see your Line Material Representative.

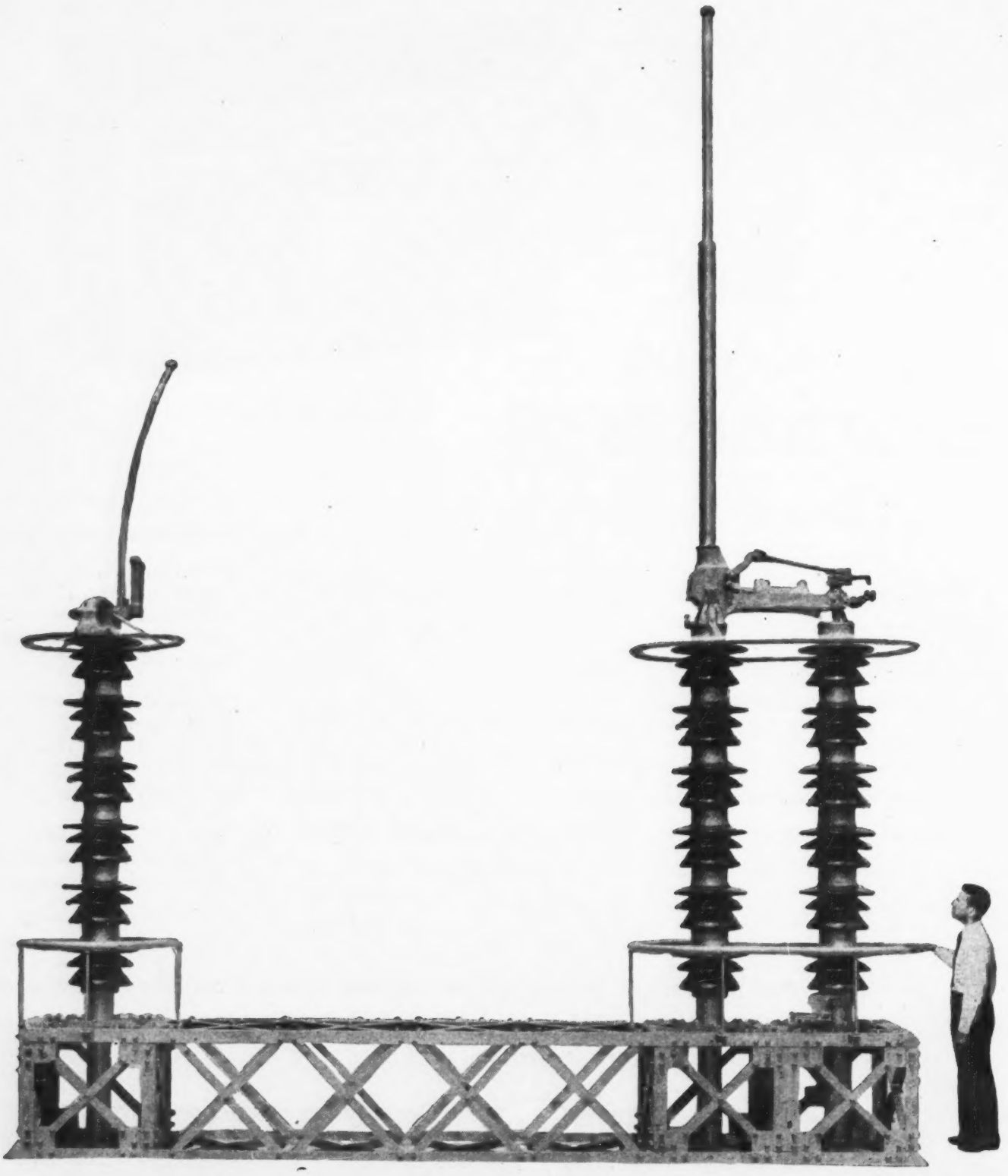
MADE BY KYLE CORPORATION SOUTH MILWAUKEE WISCONSIN

KYLE Circuit Reclosers are Designed and Manufactured for LINE MATERIAL COMPANY MILWAUKEE WISCONSIN

Cole Electric Co.

1510 So. Los Angeles St. Los Angeles (15), Calif.

PRospect 2068



AIRBREAK DISCONNECTING SWITCH
230,000 Volts—1200 Amperes, Type OU, T.P.S.T. Vertical Break, Group Operated. (One Pole Shown)

measured demand

AND THE "BILLING UNIT" . .

Measured Demand adjusted for power factor increases in importance as low power factor equipment is added to the lines.

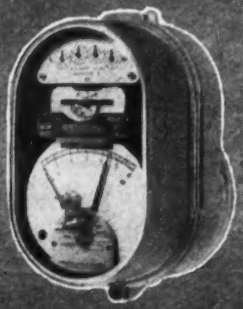
Demand billing adjusted for power factor can be accomplished simply and economically, on both singlephase and polyphase services, with a single meter properly designed for use with a coordinated rate schedule utilizing the "Billing Unit".

The Sangamo-Lincoln thermal Type WDL (lagged-potential) meter automatically records as a "Billing Unit" on a single meter demand adjusted for power factor. The angle of lag is built into the meter to measure KW and a proportion of RKVA in the ratio of RKVA cost to KW cost on the utility's system.

Details on the theory of operation and application of this type of meter will be furnished on request. Discussion of your requirements for metering equipment for special rates or billing procedures is invited.

TYPE WDL

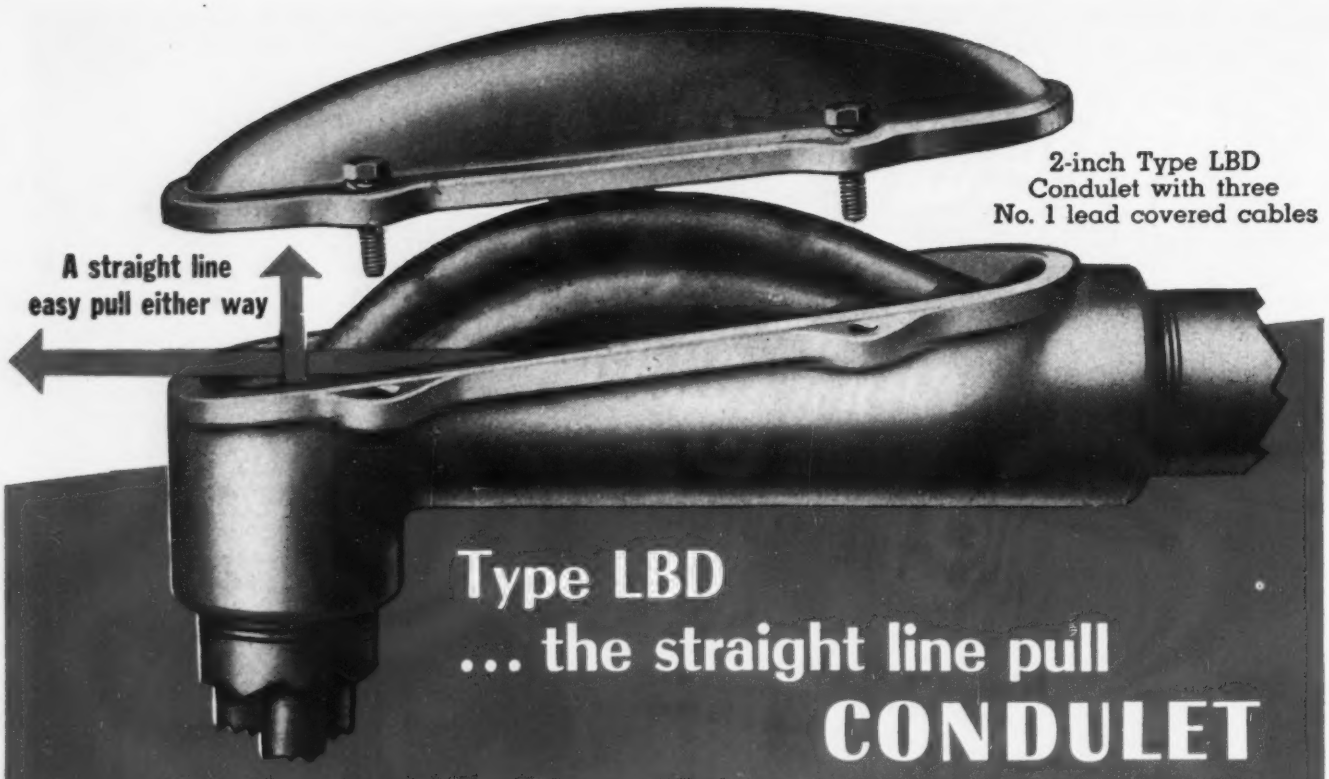
Sangamo-Lincoln thermal Type WDL Demand Meters may be supplied in both A and S construction for any singlephase or polyphase circuit for measurement of demand adjusted for a predetermined power factor without the use of a separate transformer.



TYPE JWL

Type JWL Meters combine two standard meter elements, the Sangamo Type J watthour meter and the Lincoln-Type WD demand meter, in a single unit. They are made in A and S construction for singlephase services.

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD • ILLINOIS



Type LBD
... the straight line pull
CONDULET
for large or lead covered electrical conductors

(CONDULETS are made only by CROUSE-HINDS)

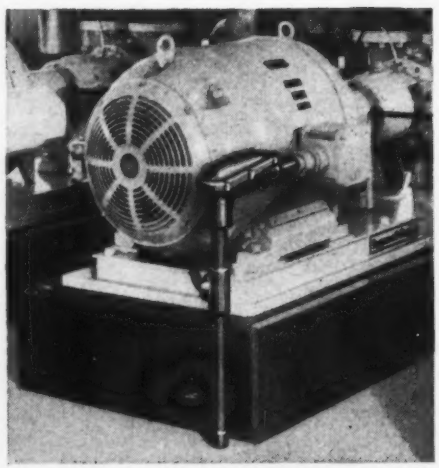
A straight line pull through EITHER hub. Saves time.

Unobstructed pulling space. Easy to manipulate conductors.

Domed cover. Provides extra space to prevent sharp bends that are likely to injure the conductor insulation or sheath.

All sizes. For electrical conduit from ½-inch up to 6-inch.

An Explosion-Proof type is available. Type LBH in sizes from ½-inch up to 3-inch.



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CONDULETS . . . first in the field and the finest

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Offices: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver — Detroit — Houston — Kansas City — Los Angeles — Milwaukee — Minneapolis — New York — Philadelphia — Pittsburgh — Portland, Ore. — San Francisco — Seattle — St. Louis — Washington. *Resident Sales Engineers:* Albany — Atlanta — Charlotte — Indianapolis — New Orleans
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CONDULETS · TRAFFIC SIGNALS · AIRPORT LIGHTING · FLOODLIGHTS

NOW—YOU CAN BRING NEW POWER TO BEAR WITH ROEBLING CABLES!

And This One Offers 6 Advantages for Your Deferred Replacement Needs

IT'S TIME TO REPLACE service-worn cables with newer types . . . for more efficient power transmission. And a first step in that direction for utility engineers is to check the advantages of Roebling Power Cables.

Note especially the Shielded Type H Paper Insulated Cable, a type of Roebling cable with an impressive record of reliability in underground transmission, distribution and service circuits. Although it is usually drawn into conduit, it also has a highly satisfactory overhead operating service record. And its construction results in 6 specific advantages:

1. Simplifies making of joints and application of terminals.
2. Provides more current carrying capacity because of the high thermal conductivity of metal shields.
3. Requires less insulation and smaller overall diameter for specified working voltages.
4. Reduces ionization markedly, since voids between lead sheath and insulation are shielded from electrical stress.
5. Eliminates harmful tangential stresses, as electrical stresses are radial.
6. Confines faults between phase and ground, simplifying protective devices.

Whether your deferred replacement needs require a standard power cable or one made to your specifications — Roebling offers you a product designed and built for service over many long years. And you can always count on Roebling engineers for assistance in cable selection problems. Our nearest branch office will gladly arrange it.

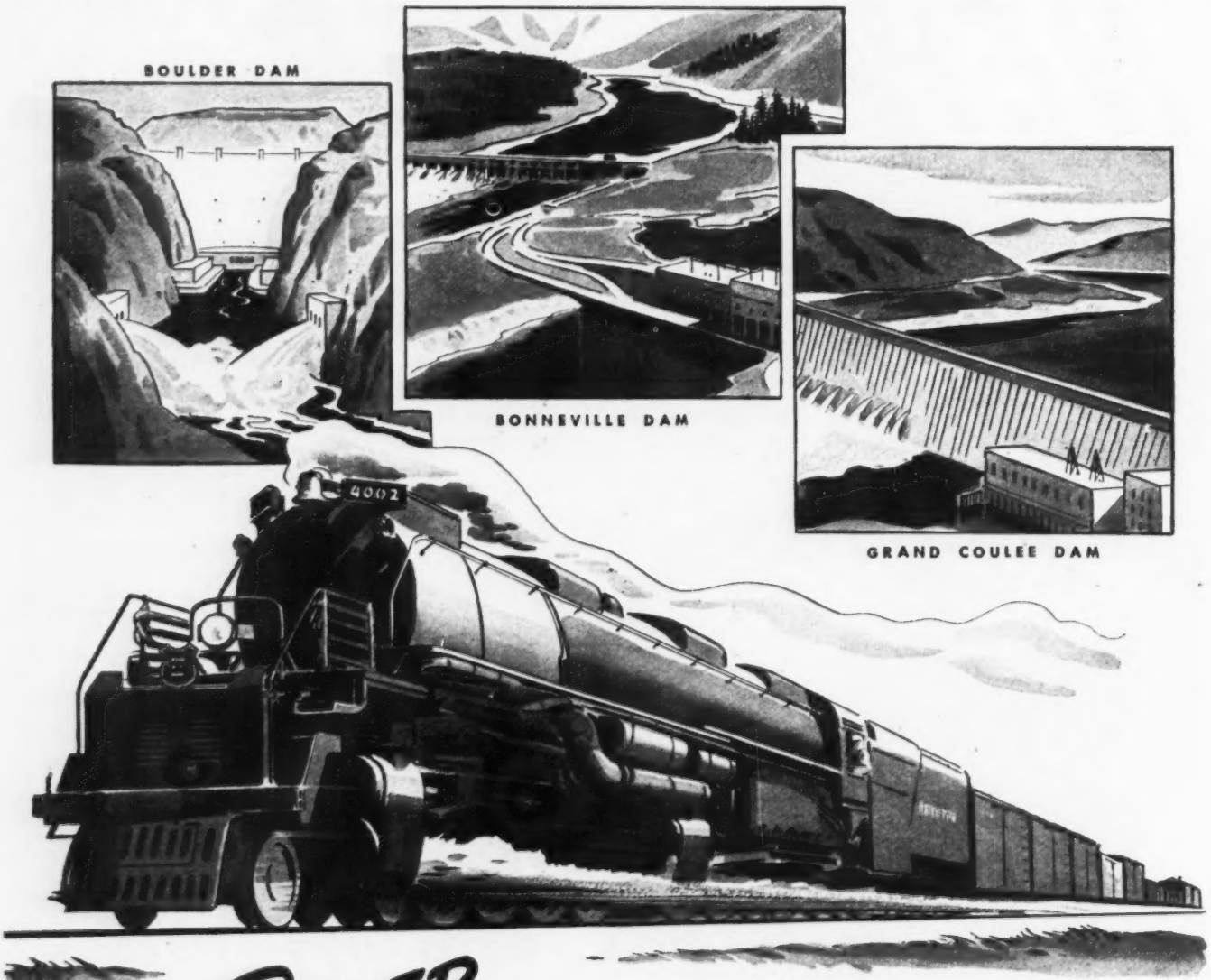
JOHN A. ROEBLING'S SONS COMPANY
OF CALIFORNIA
San Francisco • Los Angeles • Seattle • Portland

ROEBLING

ELECTRICAL WIRES AND CABLES

Weatherproof Wire • Service Entrance Cables • Rubber-Covered Wires and Cables (Including Thin-Wall Insulated Building Wires and Cables) Rubber Sheathed Portable Cables • Rubber Insulated Power Cables • Magnet Wire • Telephone Wires • Pigtail and Braided Copper • Trolley Contact Wire • Bare Copper Strand • Varnished Cambric Power Cables.

A MESSAGE TO THE ELECTRICAL INDUSTRY

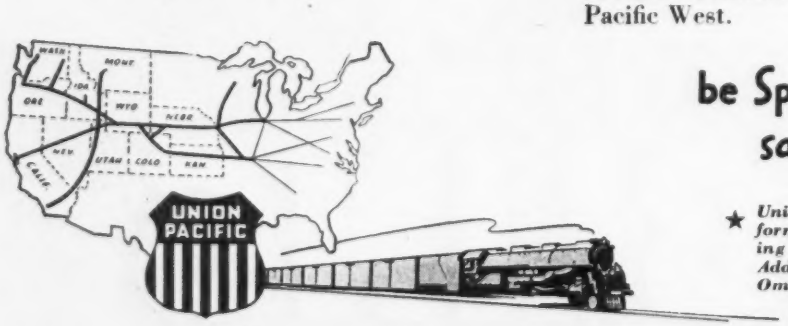


More POWER to You

Three great dams, harnessing the natural force of the Colorado and Columbia Rivers, provide tremendous industrial power.

Giants of the rails, the Union Pacific "Big Boy" locomotives provide freight transportation power over the Strategic Middle Route.

Power, light, and efficient transportation . . . combined with a wealth of raw materials and adequate "growing space" . . . offer unusual opportunities for industry in the Union Pacific West.



be Specific – say "Union Pacific"

★ *Union Pacific will gladly furnish confidential information regarding available industrial sites having trackage facilities in the territory it serves. Address Industrial Dept., Union Pacific Railroad, Omaha 2, Nebraska.*

UNION PACIFIC RAILROAD

The Strategic Middle Route

Announcing

A NEW 4-POLE THERMAL MAGNETIC TRIP MULTI-BREAKER

Trips instantly on short circuits but holds on harmless overloads

The popular MO 2-pole Multi-breaker now increased to 4-pole range

Calibrated for the new National Electrical Code, wire ratings 15, 20, 30 ampere

TYPE MO4

AVAILABLE NOVEMBER 1, 1946

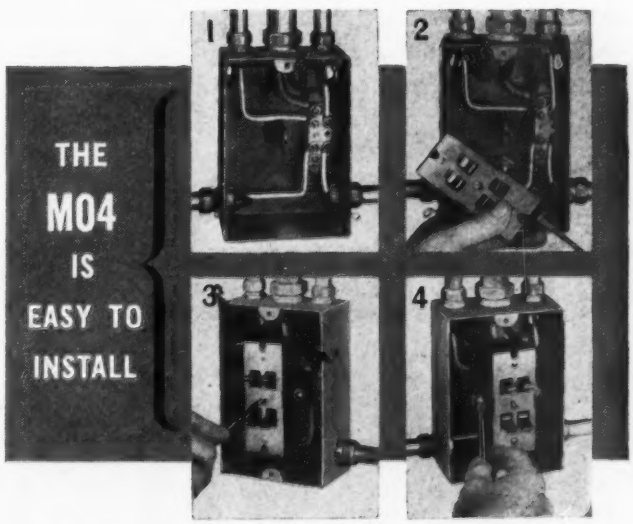
2-WAY PROTECTION FOR CIRCUIT WIRING

The magnetic trip functions in 1/50 to 1/100 of a second even on minor short circuits. This magnetic trip feature is combined with the time-tested thermal bi-metal element which provides time-delayed tripping on moderate overloads.

The MO4 MULTI-BREAKER is compact (5"x7") having 4 single poles with circuit ratings of 15, 20, 30 amperes. Either top or bottom poles can be converted into a double pole circuit by inserting a handle tie bar furnished with the device.

MO4 MULTI-BREAKERS are available for flush or surface mounting.

Specify MO4 MULTI-BREAKERS for GI homes, prefabs, schools, churches, stores, shops, factories—or on any lighting or single phase appliance circuit requiring either single or double pole circuits of 15, 20, 30 ampere capacities on 115/230 volt systems.



FOR COMPLETE DETAILS, WRITE FOR BULLETIN 4100. ADDRESS

SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

SPEED ELECTRICAL CHANGES WITH EASE . . .

You Can Do It With BullDog BUStribution DUCT

Move a machine . . . relocate a department . . . or revamp an entire factory layout. BUStribution DUCT, BullDog's modern, highly flexible electrical distribution system will meet every changing condition . . . with little or no rewiring.

Prefabricated, standardized BUStribution DUCT systems can be moved, altered and reinstalled with complete re-use of materials . . . they are 100% salvable.

Branch Circuits can be added wherever you need them because BUStribution DUCT and branch circuit fittings are designed for easy interconnection. Also, standard elbows, tees and crosses permit the system to fit any plan. Best of all, simplicity in design makes it possible to alter circuits with minimum demands for time and tools. Look at BUStribution DUCT from any angle and you see savings!

Electrical power systems are closely allied with machine tool layout. Therefore, production changes necessitate shifts in electrical power distribution. That's why it will pay you to investigate BullDog BUStribution DUCT and the advantages of "plug-in" power that is readily adaptable to changing production conditions. Write for details or call a BullDog field engineer. He can show you an installation near your own plant.

BullDog Also Manufactures Vacu-Break Safety Switches—SafToFuse Panelboards—Switchboards—Circuit Master Breakers—Industrial Trol-E-DUCT for Portable Tools, Cranes and Hoists—Universal Trol-E-DUCT for completely flexible lighting.

BULLDOG

ELECTRICAL DISTRIBUTION SYSTEMS

BULLDOG ELECTRIC PRODUCTS COMPANY, BOX 177, R. PK. ANNEX, DETROIT 32, MICHIGAN. In Canada: BullDog Electric Products, Ltd., Toronto. Field Engineering Offices In All Principal Cities

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

Coast Electric & Manufacturing Co.
1720 N. E. Sixth Avenue Tel. Garfield 2844
Portland, Oregon

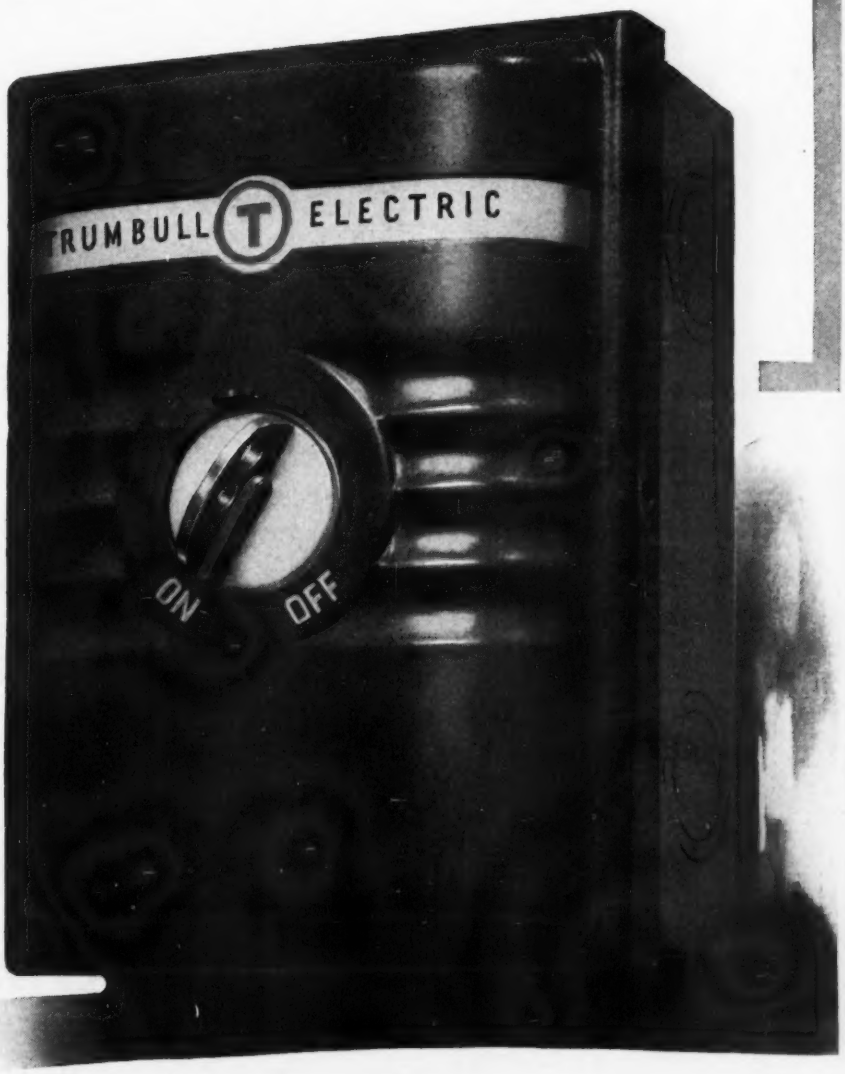
Safety Switchboard Company
1445 Stevenson St. Tel. Hemlock 2470
San Francisco, Calif.

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel. Jefferson 2224
Los Angeles, Calif.

"LET'S TAKE THE SIMPLE, INEXPENSIVE TYPE D SWITCH • • AND MAKE IT BETTER THAN IT HAS EVER BEEN MADE BEFORE"

In just those words more than a year ago, a Trumbull team of design and production engineers set to work to give the Electrical Industry's basic low-cost enclosed switch "the works". How well they have succeeded is for YOU to decide. But we know in advance what your verdict must be. For, not only is this an outstanding example of American postwar ingenuity in making a product far superior in quality and performance at low cost . . . it is also the handsomest, simplest, most easily wired, sturdiest and best engineered Type D Switch you have seen . . . or we either.

Now coming off our new streamlined production lines mighty fast. Place your orders, Gentlemen!



- ***Front* operated.**
- **Locking provision in "off" position.**
- **Straight through wiring.**
- **Back mounted.**
- **More wiring space.**
- **Switch unit removable.**
- **Very compact.**

THE TRUMBULL ELECTRIC MANUFACTURING COMPANY
PLAINVILLE, CONNECTICUT
OTHER FACTORIES AT NORWOOD, OHIO • SAN FRANCISCO • LOS ANGELES • SEATTLE

Installing KERITE
Submarine Power Cable
in Long Island Sound
•
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Pioneers in Cable Engineering

Pacific Coast Representatives: *Carlo Baldassari, 582 Market St., San Francisco 4.*
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Send for your copy

The NEW Hydent Catalog contains 64 pages of illustrations, tables and important technical data concerning Burndy Hydent (indent-type) solderless, electrical connectors; as well as tools for their installation on conductors from #22 to 2000 Mcm.

Burndy Hydent (one-piece) connectors provide strong, low-resistance, quickly-installed and inspected permanent connections when indented on conductors with manual, pneumatic or hydraulic tools. Hydent connectors are available in a variety of shapes and sizes in both aluminum and copper, for use on power line, industrial, automotive, household, marine, aircraft, electrical and electronic equipment. Write for Catalog Y46.

BURNDY

Clip today

Please send copy of Y46 to:

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BURNDY, New York 54, N. Y.

In Canada: **Canadian Line Materials, Limited, Toronto 13**

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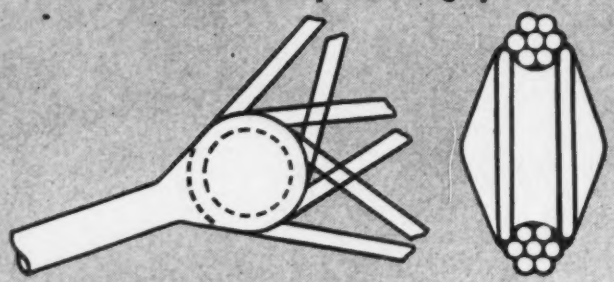
You Get Extra Strand Protection with CHANCE Improved Thimbleye Rods

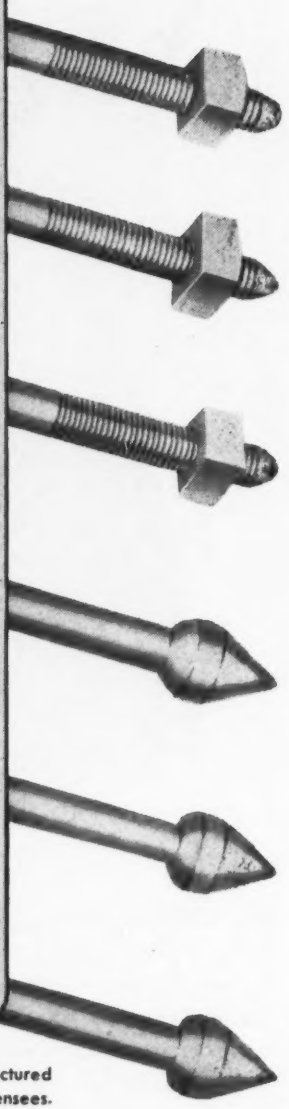
Full rounded to prevent kinking at any angle. Grooved to fit and protect guy strand.

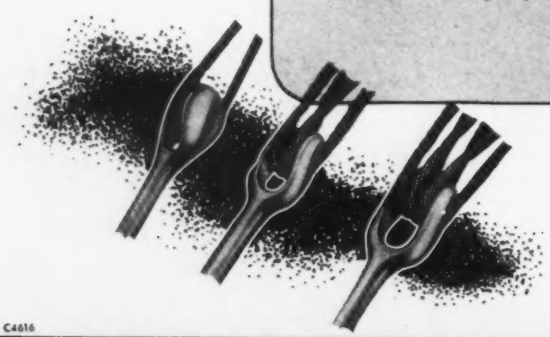


Chance Thimbleye, Twineye, and Tripleye Anchor Rods and Guying Fixtures, which have been the first choice of users for years, have been redesigned to give added protection to guy strands. The improved eye forms a perfectly shaped "Thimble" and the sidewalls and groove of the eye extend around the head of the rod, as shown in the diagram above. This keeps the strand from flattening under tension, preserves its cylindrical shape and prevents it from kinking at any one point. All grooves conform, in depth and width, to the largest cable size used with each rod or guy fixture.

All rods and fixtures are drop forged of steel and are heavily galvanized. Both Never-Creep and threaded rods are available with the improved Thimbleye, Twineye, or Tripleye for use with one, two, or three strands of cable.

For greater line security specify Chance Thimbleye Anchor Rods and get these latest improvements. Order through your regular source of supply.





Chance Thimbleye rods and guy fixtures are manufactured and sold by the A. B. Chance Company and these licensees. Joslyn Mfg. & Supply Co., Chicago, Ill. • Line Material Co., Milwaukee, Wisc. • Oliver Iron & Steel Corp., Pittsburgh, Pa. • Kortick Mfg. Co., San Francisco, Calif. • Seyler Mfg Co., Pittsburgh, Pa. • and N. Slater Co., Ltd., Hamilton, Ontario.

C4616

A·B·CHANCE CO·

CENTRALIA, MISSOURI.

SAN FRANCISCO, CALIFORNIA

ABC INDUSTRIES

There's a size and type of

CENTRAL SPANG CONDUIT

to fit your needs

If you need small or big conduit . . . raceways for hazardous locations or to resist corrosion . . . Central Rigid Steel Conduit will meet your requirements.

Central Rigid Steel Conduit is made in a wide range of sizes from ⅜ inch to 6 inches, in convenient 10 foot lengths.

Two types are available: *"Cenlaco"* offers complete corrosion protection against weather and chemicals because the inside and outside surfaces have a hot dipped galvanized and lacquered finish. *"Central Black"* has a permanent baked-on black enameled finish that will not crack, chip or flake under the severest bending strains. And it will provide wiring with permanent protection against chemical corrosion.

Both types of Central Rigid Steel Conduit meet all the National Electrical Code specifications for moisture, vapor and dust proof requirements in hazardous locations or occupancies. Every length of Cenlaco and Central Black Conduit is inspected by Underwriters' Laboratories and carries their label of approval.

All pipe used for Central Rigid Steel Conduit is carefully selected. It must have good ductility, strength and accurate diameter. That's why you can easily cut, thread or bend Central Rigid Steel Conduit. These qualities assure safe, permanent installations and tight, trouble-free joints.

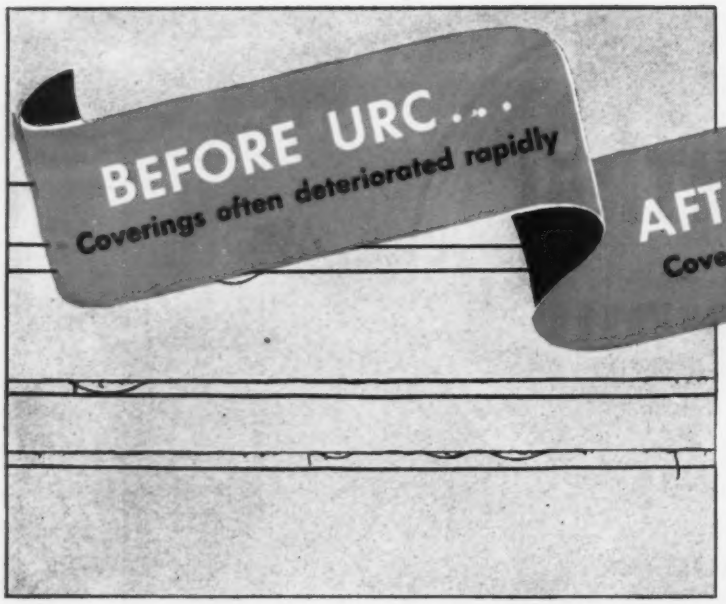
There's a tremendous demand for Central Rigid Steel Conduit. This, plus material shortages, may make it difficult at times to get all of the Central Rigid Steel Conduit you want. But keep in touch with your jobber—he will make sure you get your share of the available supply.

"There's Tested Strength in Every Length"

Inside surfaces of Central Rigid Steel Conduit are inspected with the aid of strong lights. That's why you're assured that every length you receive has a smooth inside surface which permits wire to be easily inserted or withdrawn.

SPANG-CHALFANT

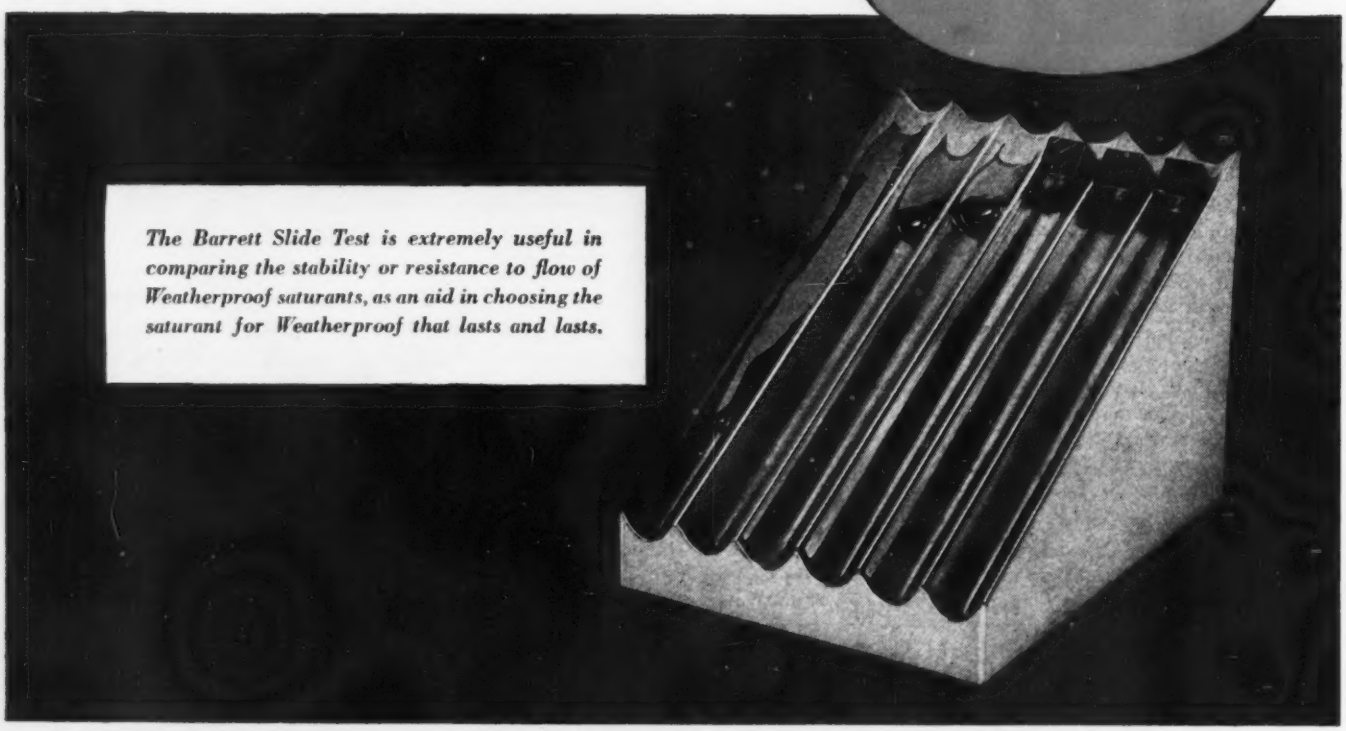
Division of The National Supply Company
General Sales Offices: Grant Bldg., Pittsburgh 30, Pa.
District Offices and Sales Representatives in Principal Cities



URC saturant and finisher have given a new meaning to Weatherproof. All component materials are subjected to several major tests to prove their resistance to severe service conditions. Accelerated and field aging tests now indicate years and years of sturdy service.

ANACONDA
from mine to you consumer

FOR CONTINUITY OF SERVICE
... ANACONDA TRIPLE BRAID
or DURALINE URC



The Barrett Slide Test is extremely useful in comparing the stability or resistance to flow of Weatherproof saturants, as an aid in choosing the saturant for Weatherproof that lasts and lasts.

LOOK TO *Anaconda* FOR WEATHERPROOF THAT LASTS

PRODUCTS

that are news

Line Type Arresters (1200)

Line Material Co. is now manufacturing a complete line of line type arresters in ratings of 20 to 73 kv.

A capacitance type voltage divider is incorporated in the spark gap to nullify the effects of stray electrical fields from nearby conductors. The divider utilizes ceramic insulating spacers with a dielectric constant announced as 200 times that of the usual ceramic insulators.

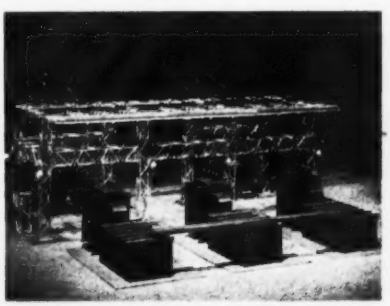
Motors (1201)

Allis-Chalmers is now making a complete line of outdoor weatherproof, totally enclosed motors in the larger sizes ranging to and above 2,000 hp. The ventilation heat-transfer system has been redesigned, the manufacturer states, making air passages practically self-cleaning and eliminating pockets in which water or liquid might be trapped. Air passage tubes can be cleaned with a brush or an air or water hose.

Alarm System (1202)

A fire and cold alarm system known as the Detecto-Master has been introduced by Lord-Taber Co. Inc. Designed for farms, homes, industrial plants, the system includes a central control unit, 15 master thermostats, up to 300 auxiliary thermostats, each effective over a 4,800 cu. ft. area. In operation, critical temperature changes are transmitted to the control unit which (1) rings a bell, (2) switches on a red light, (3) designates on a meter dial the trouble location. If a wire or thermostat is accidentally broken, the alarm signals will operate as if the temperature change had occurred, the manufacturer claims.

Package Substations (1203)



Package substations are available from General Electric in ratings from 750 to 45,000 kva. These packages incorporate standard transforming, regulating, relaying, metering and protective equipment. Shipments are made on a coordinated time schedule and in preassembled sections as large as transportation and handling facilities will permit. A high degree of flexibility to allow for future load changes is claimed for many of the package arrangements available. The illustration shows one of the largest of the new units, a low-voltage-selective substation for loop or multiple subtransmission systems. Standard ratings for this arrangement are 4,500 to 45,000 kva., incoming voltage 11 to 69 kv. and outgoing feeder voltage 2.4 to 13.8 kv.

"I know they're good... they're KLEINS

"IF you've ever worked on a pole 50 feet in the air with the wind whistling around your ears, you know why linemen need good tools. That's why there'll always be a pair of Kleins in my tool belt. I know they're good."

Yes, to the men who install and maintain the nation's power and communication lines there is only one kind of pliers . . . Kleins. There's a sound reason for this overwhelming preference. For linemen and electricians—men who know good tools—also know of the quality materials and handcraftsmanship that go into every pair of Kleins. To them this excellence means speed, efficiency and safety on every job.

The complete line of Klein Pliers is in full production but demand still exceeds supply. Your supplier will fill your order as soon as possible.

ASK YOUR SUPPLIER

Foreign Distributor:

International Standard Electric Corp., New York

A copy of the Klein Pocket Tool Guide, showing the Klein line and containing valuable tool information, will be sent on request.

Mathias KLEIN & Sons
Established 1857 Chicago, Ill., U.S.A.
3200 BELMONT AVENUE, CHICAGO 18, ILLINOIS

CRESCENT
WIRE AND CABLE

To Wire a Cottage or Light a City!

CRESCENT produces all kinds of wire and cable for any type of building—industrial, commercial or residential. CRESCENT products are sold through electrical wholesalers in every large city in the country to electrical contractors, who know from experience or by reputation the unfailing quality of CRESCENT WIRES AND CABLES.

CRESCENT INSULATED WIRE & CABLE CO.
TRENTON, N. J.

Ray Murphy Co., 720 E. 2nd St., Los Angeles, Cal.
Electric Agencies, Suite 619-620 Mutual Life Bldg., 605 First Ave., Seattle 4, Wash.

Thermostat (1204)

Model CD109A Cam-Stat room thermostat has been announced for the domestic and commercial heating and ventilating fields and for use on trains, buses, airplanes and ships. This model is said to be no larger than an ordinary light switch and to extend less than an inch from the wall. No electrical parts are exposed underneath the screen, current-carrying parts being enclosed within the bakelite housing behind the wall plate. Current-carrying capacity is 1,500 va., ¼ hp., and 125 va. pilot duty at 120-240 volts a-c; range is standard at 50-100° F with a differential of 2-3° F. Switching arrangements are SPST break or make on temperature rise, SPDT and independent circuit double throw. Said to be suitable for line-voltage or low-voltage currents.

Terminal Block (1205)

Cannon Electric has introduced Type "Y6" terminal block for aircraft, radio and other equipment carrying many low-amperage circuits. The basic unit is built with foot brackets, having two mounting holes each, and six-socket contact block. From this basic unit, additions may be made, vertically and horizontally, with side brackets and extra top interlocking strips. A single contact or six-contact plug may be plugged into either side. A crimp type and a standard solder-pot type contact are available, but the six-contact plug carries solder-pot contacts only. Contacts are brass, silver-plated and accommodate No. 16 AWG wire for 5-amp. circuits; may be bussed if desired.

Core-Loss Tester (1206)

A desk type instrument to measure a-c permeability and core loss in steel samples has been designed by G-E. It meets ASTM specifications at commercial power frequencies and inductions up to 18 kilogausses. The core-loss tester can be supplied with a power pack which holds constant-wave shape and frequency or it can be used with a sine-wave generator for power supply.

Current Transformers (1207)

Two new G-E current transformers for meter, relay and control device applications are the JKL-3 and the JKL-4. The former is rated 5,000 volts, 1,200 to 4,000 amp. and is designed to withstand full-wave impulse tests at 60 kv. The later is rated 8,700 volts, 1,200 to 4,000 amp. and is designed to withstand full-wave impulse tests at 75 kv.

Relays (1208)

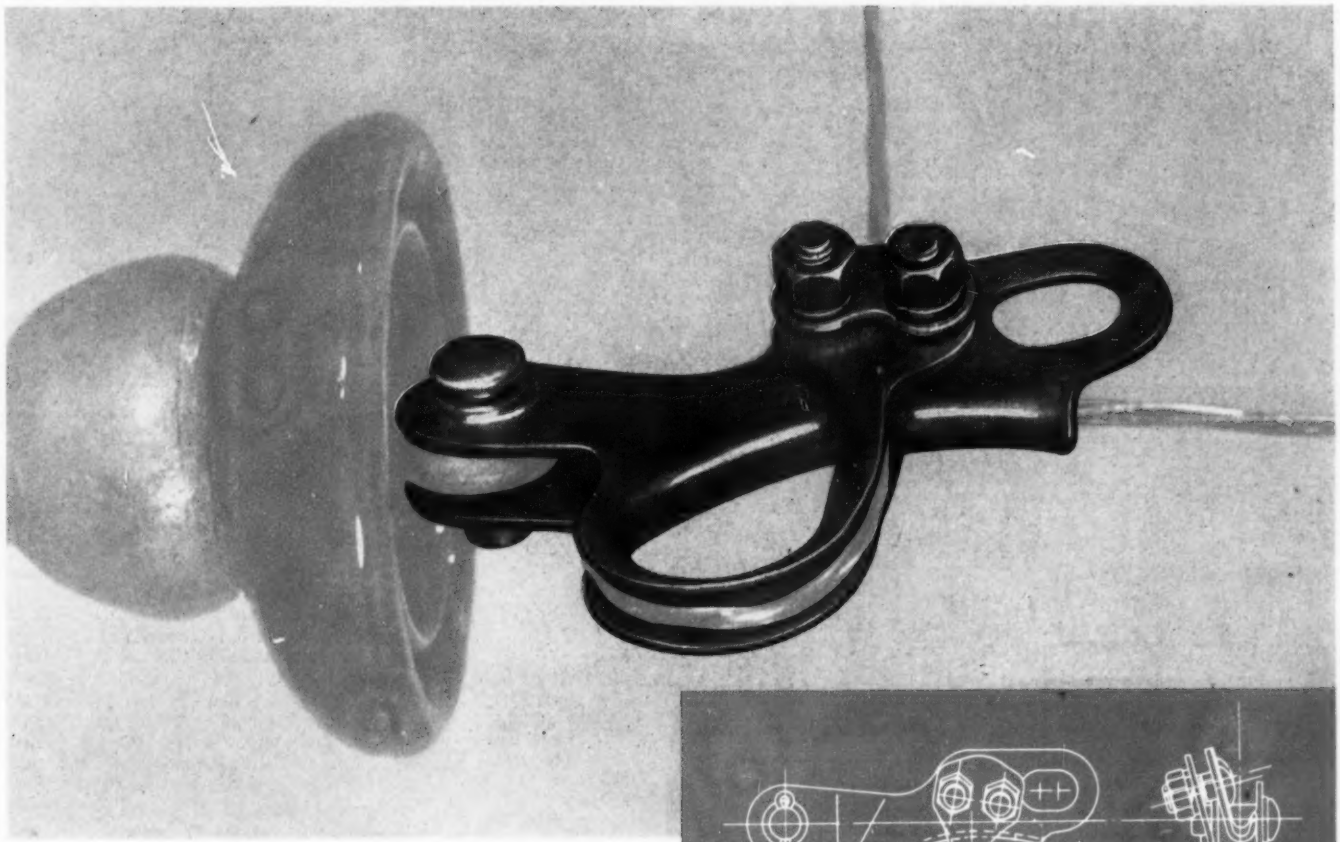
Addition to the Signal Engineering & Mfg. Co. line of heavy-duty multiple-arm relays is one having a contact capacity of 50 amp. at 115 volts a-c or 24 volts d-c. Contact arrangement is double-pole single-throw, with two breaks per pole. Coil voltages up to 230 volts; over-all dimensions, 4x4½x2½ in.; weight, 1¾ lb.

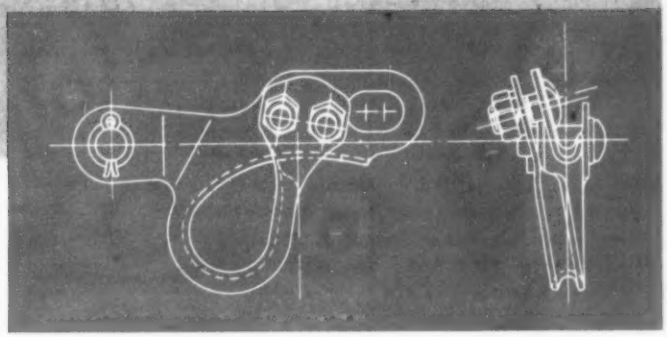
Synchronous Motor (1209)

The new Cramer SX synchronous motor is 2⅜ x 2⅛ x 1½ in. and has a torque of 30 in. oz. at 1 r.p.m.; power input of 2.7 watts at 115 or 230 volts, 60 cycles. Twenty-eight standard gear trains range in speeds from 60 r.p.m. to one revolution in 24 hours. This motor is available now in 60 cycles; will be produced later in 25 and 50 cycles.

NEW BTC STRAIN CLAMP

for Dead-ending Rural and Distribution Line Conductors





An entirely new manufacturing method has been developed to produce the new BTC No. 2106 Strain Clamp with general design of the familiar, accepted Snail-Shell Snubbing Type.

Pressed from heavy-gauge steel, the body of the BTC Clamp is one-piece with no riveted or welded joints to "weep acid" after galvanizing. This clamp handles a wide range of conductor cable sizes from 0.160 in. to 0.366 in. thereby reducing necessary storeroom stocks. The clamp has adequate ultimate and slip strength and is approved by R.E.A., except for ACSR.

Write Brewer-Titchener for full details on this new Strain Clamp which features—

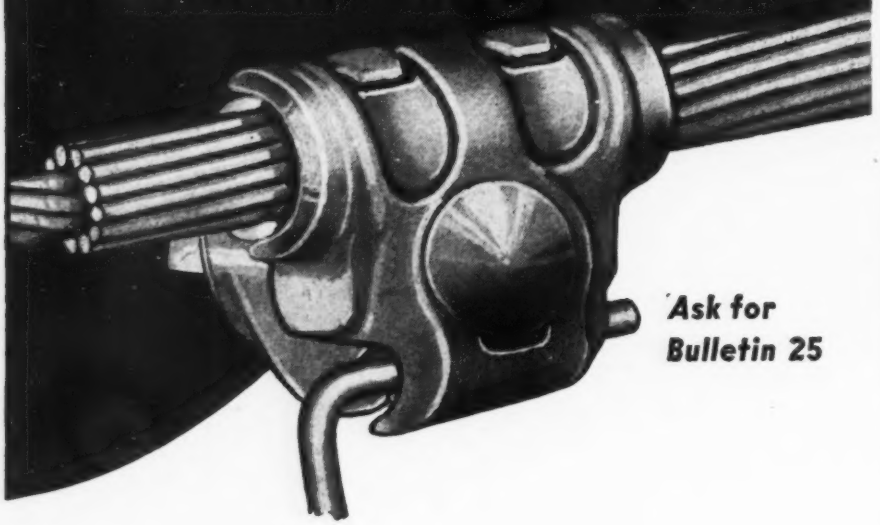
- *Minimized effects of cable vibration* because of light weight and short connecting length.
- *Prevention of conductor damage* by amply large snubbing radii, smooth die-formed cable seat and long clamping section.
- *Easy installation* made possible by come-along loop and only one clamping bolt to be removed with only one wrench necessary.
- *Long service life* assured by excellent hot-dip galvanizing job.
- *Low price* gained by modern manufacturing methods.

Sold only through your insulator manufacturer

THE BREWER-TITCHENER CORPORATION

CORTLAND, N. Y.

SHERMAN Announces an
IMPROVED CAST ALUMINUM
ARMOR ROD CLAMP



Ask for Bulletin 25

Catalog No. R101
— For Copper Tap Connections
A pure copper liner is bonded by a special process in small groove.
LARGE GROOVE:
#6 to #1/0 ACSR over Armor Rods
SMALL GROOVE:
With Copper Liner
#8 to #1 stranded copper
#8 to #2A Copperweld
Standard Package quantity—100

Catalog No. R102
— For Aluminum, Amerductor or Galvanized Steel Strand Tap Connections
LARGE GROOVE:
#6 to #1/0 ACSR over Armor Rods
SMALL GROOVE:
#6 to #1 ACSR
#10SCG to #2SCG Amerductor
#9 Solid to 3/8" Galvanized Steel Strand
Standard Package quantity—100

UNIQUE INTERLOCKING CONSTRUCTION ELIMINATES NEED OF REMOVING BOLT TO INSTALL

Your linemen will like these improved new Sherman Armor Rod Clamps.

Clamp bodies are a special silicon aluminum alloy having exceptionally high tensile strength and corrosion resistance. Full size 3/8" galvanized steel carriage bolt with large nut and lock washer. Interlocking fingers enclose armor rods in full grip.

The construction of this clamp permits installation without removing nut or bolt.

Order from your wholesaler.

H. B. Sherman Mfg. Co.
BATTLE CREEK, MICHIGAN

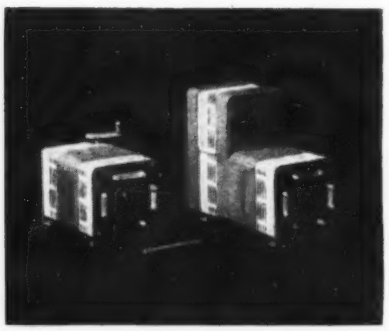
Sherman ELECTRICAL CONNECTORS

Unit Substations (1210)

Wagner Electric Corp. is offering unit substations in ratings of 150, 200 and 300 kva., three-phase, 60 cycles. Units are delivered ready to connect; different types of transformers and high- and low-voltage equipment are available. Illustrated is enclosed substation with air-cooled transformer for indoor installation. Noflamol or oil-filled self-cooled transformers also are available.

Inductrols (1211)

An extended line of dry type induction voltage regulators to include 300- and 600-va. ratings is announced by General Electric. There are two designs: hand or motor operated for providing variable output voltage from relatively constant supply voltage; and automatic for maintaining closely regulated output from varying supply. Typical applications include motor speed, electric furnace heat, illumination and rectifier control, and dielectric testing and instrument calibrating. The units, called Inductrols, are designed for continuous operation with temperature rise under 55°C. Weights range from 32 to 57 lb.



Synthetic Adhesive (1212)

A new synthetic waterproof adhesive, claimed to be more resistant to oxidation than similar natural rubber compounds, was announced recently by DuPont. It is recommended by the manufacturer for bonding Buna-N type synthetic rubbers and vinyl films or sheet stocks to rigid surfaces such as steel, aluminum, glass, wood or concrete. Designated as No. 5118 "Fairprene" adhesive cement, it does not require vulcanization for maximum adhesive strength, according to the manufacturer. It is unaffected by temperatures as low as 40° F; adhesive strength is weakened at 160° F and above, but is regained after cooling to normal temperatures. It will dry to a tacky surface under average conditions in three to ten minutes and will dry completely within two hours.

RB&W
THE COMPLETE QUALITY LINE

RUSSELL, BURDSALL & WARD BOLT AND NUT CO.

Announcement

WE take pleasure in announcing that we have acquired the plant and other assets of the Cooper Screw Manufacturing Company of Los Angeles. This acquisition completes our chain of four plants, stretching across the United States.

RUSSELL, BURDSALL & WARD BOLT AND NUT CO.
Manufacturers of Bolts, Nuts, Rivets and Screws
Since 1845

PORT CHESTER, N. Y.
ROCK FALLS, ILL.
CORAOPOLIS, PA.
LOS ANGELES, CALIF.

101 YEARS — *Making strong the things that make America strong*

The New Home of Lloyd PRODUCTS

Lloyd appreciates the patience and forbearance you have shown when overloaded manufacturing facilities slowed down delivery of Lloyd Flex-Loc Lamp Holders and Lloyd Automatic Starters. We are now at home in this large modern plant, where greatly increased facilities will make possible greater service to all our customers . . . service which we hope will match in quality the matchless Flex-Loc Lamp Holders and Lloyd Automatic Starters.

LLOYD POLICY INSURES QUALITY

651-F
FLEX-LOC Lamp Holder

Automatically self-adjusting. Engineered to fit ALL STANDARD spacings. POSITIVE AUTOMATIC LOCK. PERFECT ELECTRICAL CONTACT. Brass contacts grip BOTH sides of lamp pins securely.

Listed and Approved by Underwriters' Lab., Inc., and Canadian Standards Assoc., App. Division E.T.L. Test Report 314454 Available

Patented—Other patents pending.

FS-40
AUTOMATIC Starter

CUTS OUT deactivated or flickering lamps. CUTS OUT current to lamp and ballast. Increases life of lamp and ballast.

Listed and Approved by Underwriters' Lab., Inc.

Certified by E.T.L., Spec. 6
Pat. Nos. 2200443-2228210

LLOYD PRODUCTS CO.
PROVIDENCE 5 RHODE ISLAND

FRANK H. BRAN CO.
400 E. 3rd St., Los Angeles

W. G. BRUCE CO.
2028 S.W. Yamhill St., Portland, Ore.

FRANK H. BRAN CO.
894 Folsom St., San Francisco

HARVEY M. OLMSTEAD
1534 Warren St., Denver

WILLIAM H. SANDERLIN, 129 First Ave., Seattle

Stock Drinking Cup (1213)

G-E has developed en electrically heated automatic stock drinking cup for use outside the barn wherever a supply of water under pressure and a 115-volt a-c power supply is available. The animal puts its nose against a treadle in the cup and water flows in as fast as the animal drinks. A cast iron cup is set in the top of a steel cylinder which is about a foot in diameter and four feet long. A Calrod heater is mounted on the bottom of the cup and heating cable is wrapped around the 4-ft. vertical water pipe running up to the cup inside the housing. A thermostat automatically maintains the water in cup and pipe at a temperature safely above freezing and cuts off all electric power at about 50° F. The housing is buried in the ground to leave the cup at the correct height for livestock. Power leads and water pipe connect at the base of the housing and are buried below the frost line.

Fence Control (1214)

Prime Mfg. Co.'s postwar electric fence controller, Model 486, has an automatic signaling system consisting of a series of neon bulbs balanced in the fence circuit to show current leakage. Another feature is a shock control switch which permits the farmer to select the combination of voltage and current for wet, normal and dry operating conditions.

Fixture Design Changes (1215)

To simplify maintenance, Sylvania has made design changes in its fluorescent fixtures. In the commercial line, all ballasts are now fastened to the top housing with "Z" screws, a self-tapping type of screw which is driven through ballast mounting slots on the inside into embossings in the top housing, making it possible to remove the ballast without taking the top housing from the ceiling.

In the double-length industrial fixtures, HFF-208 and HFF-308, relocation of all starters to a center position between the two reflectors on the underside of the top housing permits the group to be serviced at one time. Starters are said to be less subject to moisture and dust.

Push-button Units (1216)

G-E has introduced a line of oiltight push-button units, selector switches and indicating lights, designed for the machine tool and automotive industries. The momentary-contact push-button units are available in several forms: a single-pole with a normally open and a normally closed circuit; a three-point unit giving two normally open circuits with common connection; double-pole units available with either normally open or normally closed circuits. The selector switch is available in single-pole double-throw or double-pole single-throw forms. The indicating light unit has the same single-pole mounting arrangement as the push-button units and selector switches; available for use on 110-125 or 250 volts, a-c or d-c, and may be used on higher voltages with separately mounted resistors.

Projection Lamps (1217)

Sylvania will introduce three new projection lamps, featuring especially rugged filament mount and construction and designed for maximum brilliance of screen image; 300,- 500,- and 750-watt sizes.

it's

PVX

The New Non-metallic Sheathed Cable for Residential and Farm Wiring.

Tough. Moisture resistant. Smooth, hard finish. Those words accurately describe three important features of PVX non-metallic cable that mean a lot to users.

Take toughness. From the mechanically and dielectrically strong thermoplastic insulation of the Type T conductors right through every component part — improved crushed-paper armor, waterproof jute fillers, over-all braid — PVX cable is constructed to give long, efficient service without pampering or special care. Treat it rough if you have to. PVX can take it.

And moisture resistance. This means more than a mere protective surface covering. True, the over-all braid resists moisture, but so do the jute fillers, the paper armor, and the thermoplastic insulation. Think what this means in installations where humidity is high. And don't forget that PVX is flame resistant and will not support combustion.

Not to mention the finish. A smooth, hard finish provides a double-barreled advantage in PVX. On the thermoplastic insulation it means that no protecting braid is required, thus extra weight is eliminated. On the over-all braid it means that there is no marking or tacking to soil hands and walls and hamper installation.

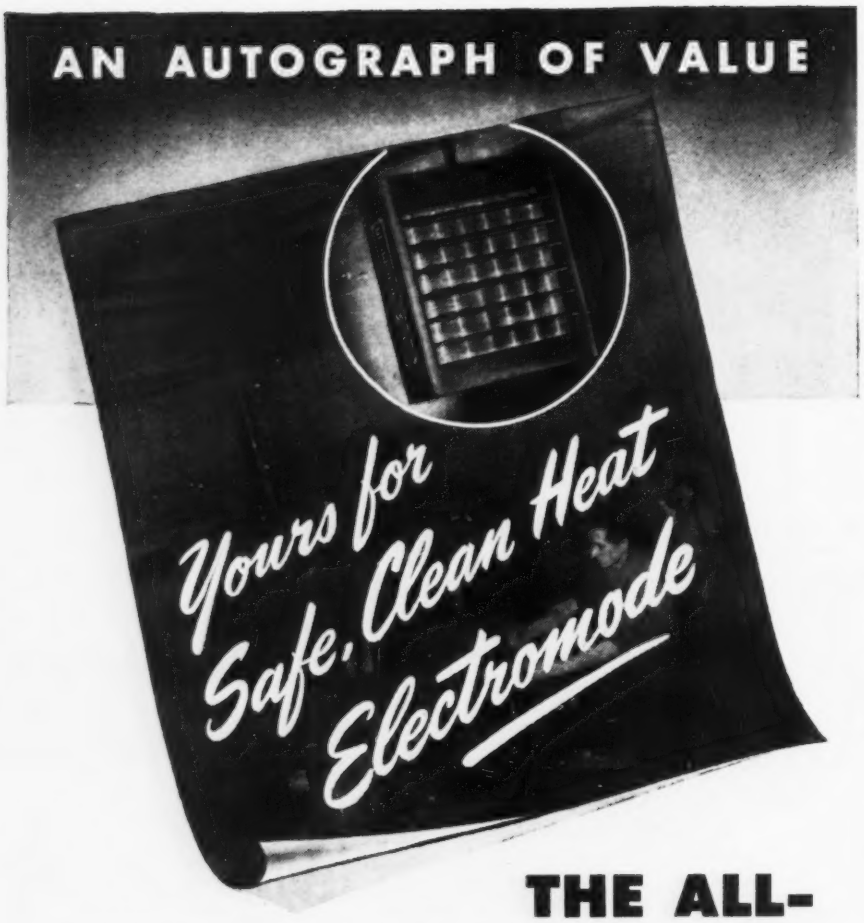
What else? Just a few things like easy stripping, small over-all diameter, light weight, and Underwriters' Laboratories' approval for 60 C operation. They are important features, too.

If you would like to know more about this versatile cable, why not ask your G-E Merchandise Distributor, or write to Section W18-1218, Appliance and Merchandise Department, General Electric Company, Bridgeport 2, Conn.

CABLE DIMENSIONS

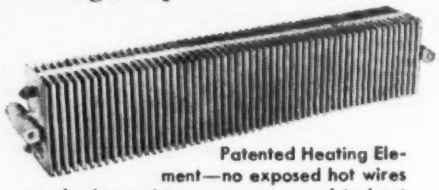
No. 14/2 PVX Non-metallic Sheathed cable
Type T Conductor — 0.131 inches
Over-all Dimensions — 0.34 x 0.46 inches
Weight per M Feet — 77 pounds

GENERAL ELECTRIC



THE ALL-ELECTRIC UNIT HEATER

The name Electromode on your plant Unit Heaters is assurance of economical heating available where and when it is needed without expensive piping, piping connections, insulation, and costly maintenance. Electromodes are easily and quickly installed wherever circuit wires can be run. They are also simple to remove and relocate as need determines. Factory areas, stockrooms, warehouses, isolated buildings, departments run overtime when central heating is off, are only a few places where Electromode all-electric Unit Heaters do the job better, giving greater value per dollar invested.



Patented Heating Element—no exposed hot wires or glowing resistors—same as used to heat U. S. Submarines.

All hazards of fire, shock or explosion are eliminated with an Electromode installation. The sheathed heating element embedded in a one-piece finned aluminum casting is completely isolated from any external contacts; there are no exposed glowing resistors, no incandescent hot wires. All electrical energy is converted 100% into heat and no current is used when not "on." Control may be manual or automatic. Your Electrical Wholesaler can help you in selection of proper capacities.

ELECTROMODE CORPORATION, 59-12 Crouch St., Rochester 3, N. Y.

Latest Bulletin 45-U and Heating Survey Form sent promptly upon request

ELECTROMODE
Electric Unit Heaters

WEST COAST FACTORY REPRESENTATIVES—RUSSELL AND COMPANY, 1355 Market Street, San Francisco 3, Calif.; HARRY F. HALDEMAN, INC., 1106 South Hope Street, Los Angeles 15, Calif.; FRED W. CARLSON, 307 Wall Street, Seattle 1, Wash.; JOHN W. LADLOW, P. O. Box 1784, Phoenix, Ariz.

Electronic Flash Tube (1218)

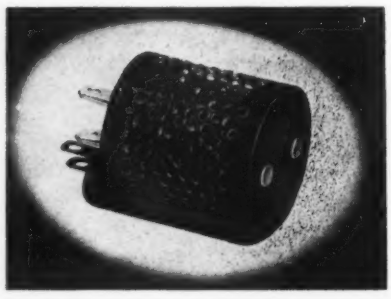
An electronic flash tube designed particularly for black and white and color photography and providing a peak output of 48 million lumens has been announced by Sylvania Electric Products Inc. The light is said to have a daylight quality which produces an almost flat curve between 4,000 and 7,000 angstroms. Tube life is rated at more than 10,000 flashes with maximum repetition rate of four times a minute. It is suitable for condenser discharge circuits where a 120 mfd. condenser is discharged at 2,500 volts. These circuit values provide a flash of approximately 1/5,000th of a second duration.

Synchroscope (1219)

Sylvania has designed a synchroscope for examining the shape, amplitude and duration of pulsed waveforms. The instrument includes a 5-in. cathode ray oscilloscope; trigger generator for synchronization; space for addition of a video amplifier and r-f envelope viewer; adjustable time delay phasing circuits, and seven input connectors and selector switch for rapid viewing of separate external circuits. This device is rated at 200 watts, 105-125 volts, 50-60 cycle a-c and is supplied with or without an r-f detector and video amplifier.

F Lamp Resistors (1220)

Ward Leonard's Bulletin 26 plug-in type fluorescent lamp resistors are designed for use with single lamps up to and including a 20-watt (T12) 24-in. size. Operating as



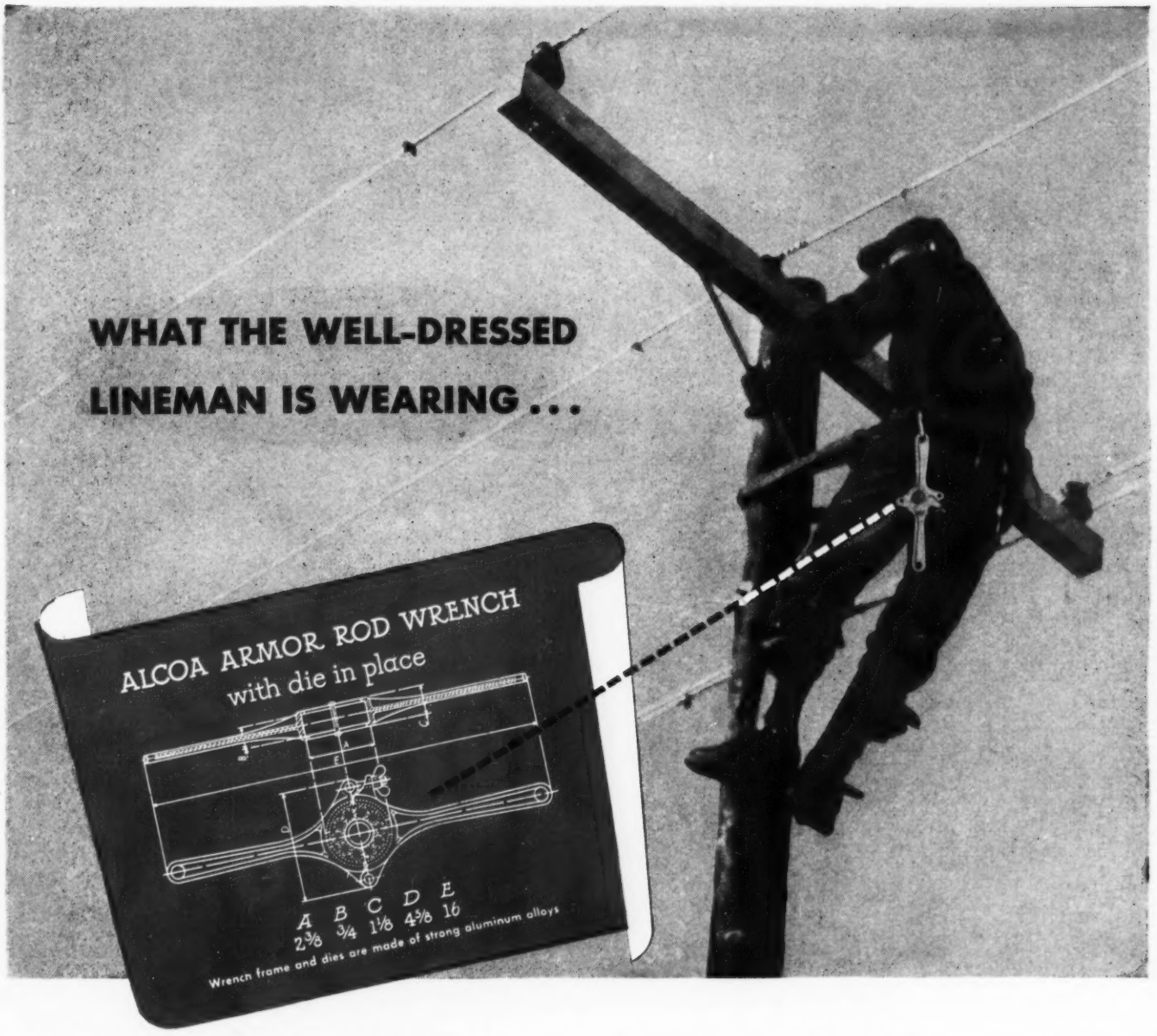
an adapter unit, the resistor is pluggd in between the lamp fixture and the d-c outlet. According to the manufacturer, this fixed resistor unit requires no wiring and is connected in series with the auxiliary d-c ballast, serving to limit the fluorescent lamp current.

Flashlight Case (1221)

Ideal is offering a plastic flashlight case which it claims is tough, waterproof and shockproof. It can be used around power lines with safety, according to the manufacturer, and, except for metal parts, resists corrosion of exhausted dry cells and is unaffected by oils, greases or gasoline. Of the prefocused type, it is designed for two 1¼ in. D dry cells.

Street Lighting Unit (1222)

Westinghouse has a new type OV-20 enclosed street lighting luminaire which it claims directs approximately 50% of output on the roadway as compared with 27 to 30% for previous units. Both reflector and refractor are oval and light from either a 20,000- or a 10,000-lumen mercury lamp is concentrated into two main beams.


WHAT THE WELL-DRESSED
LINEMAN IS WEARING . . .
ALCOA ARMOR ROD WRENCH
with die in place
A B C D E
2⅜ ¾ 1⅛ 4⅜ 16
Wrench frame and dies are made of strong aluminum alloys

He's just put the finishing touch to a well-engineered line

Alcoa Aluminum Armor Rods reinforce conductors at points of support, preventing vibration failures. Armor rods also prevent chafing, take the brunt of flashovers at insulators, and are invaluable for repairing lines where such damage has already occurred.

Armor rods are evidence of careful, wise engineering. They pay off through lower operating costs.

For advice on the use of armor rods, for assistance in selecting Alcoa A.C.S.R. for your lines, call the nearby Alcoa office. Or write ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA A·C·S·R
ALUMINUM CABLE STEEL REINFORCED

HERE IT IS—
SYLVANIA'S THIRD FLUORESCENT LIGHTING CONTEST

$2000.00
IN CASH PRIZES

FOR THE BEST SCHOOLROOM LIGHTING FIXTURE DESIGN *and Lighting Layout...*

In case of ties duplicate prizes will be awarded. Closing date: March 15, 1947.
Entry blanks must be postmarked before midnight January 15, 1947.

FIRST PRIZE . . $500.00 **THIRD PRIZE . . $200.00**
SECOND PRIZE . $300.00 **FOURTH PRIZE . $100.00**
and 18 ADDITIONAL $50.00 PRIZES

★ ★ ★

Here's your opportunity to contribute to the encouragement of better lighting throughout the American school system—and win a valuable prize as well! Send in, today, coupon below to receive free, complete information—plus entry blank—about Sylvania's third big, new contest.

Stuart Goodwillie, Sylvania Electric Products Inc., 500 Fifth Ave., New York 18, N. Y. Kindly send details of Third Sylvania Lighting Contest.

NAME.....

ADDRESS.....

CITY.....**STATE**.....

SYLVANIA ELECTRIC

MAKERS OF FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES; ELECTRIC LIGHT BULBS, RADIO TUBES; CATHODE RAY TUBES; ELECTRONIC DEVICES

Hot-Line Clamp (1223)

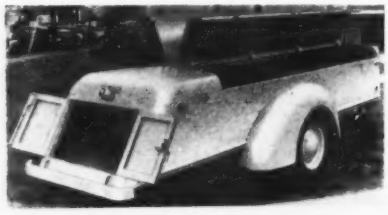
A new hot-line clamp, cold forged of pure copper and for wire sizes from No. 1 strand to No. 6 solid, has been announced by Reliable Electric Co. The eye screw is Everdur with standard thread; a lug at the base fits all clamp sticks. A split bolt connector makes the tap connection. The clamp is supplied as standard with Reliable No. 4F connector, which accommodates two No. 4 conductors, so leads may be run to both transformer and lightning arrester. For larger taps a larger split bolt connector may be installed up to the No. 1F size, which accommodates a pair of No. 1 solid or No. 2 strand wires or a single tap of No. 1 strand size.

Cable Reel (1224)

Designed for use with traveling hoists, the Appleton Electric Co.'s new Type "YS" Reelite automatically takes up, pays out conductor cable, serves any stretch of track up to double its cable length, the manufacturer states. For curved track and certain straight track installations, the reel is furnished with swivel base, permitting rotation up to 335°.

Tool Trailer (1225)

A. B. Chance is making available to utilities a tool trailer patterned on those used by its demonstration men. Built by the McCabe Powers Co. exclusively for Chance, these trailers have racks for hot-line tools and troughs for accessories. A heating unit may be plugged in when the trailer is in storage to keep tools dry. Trailers are available with tow bars, brakes, color and lettering to meet requirements.



Connector Kit (1226)

The new Burndy Hylug connector kit is said to contain everything necessary for making small-wire solderless electrical connections. It contains 325 assorted connectors for No. 20 through No. 10 wire and a tool for installation.

Soldering Iron (1227)

Sound Equipment Corp. is offering a conventional type, 100-watt electrical soldering iron. Called KopperKore, this iron has a copper alloy core and heater element of nichrome wire, encased in a damage-proof steel case, the announcement states.

EVERY BREEZE...
the VIBRANT FORCE
that causes FATIGUE
on OVERHEAD LINES

TO COUNTERACT *VIBRATION* INSTALL HUBBARD STOCKBRIDGE DAMPERS

The simplest means of correcting the destructive force of incipient vibration on overhead conductors is found in Hubbard Stockbridge Vibration Dampers. Installed a measured distance from the insulator ties, at each end of the conductor span, these resilient dampers absorb the force set up by low velocity winds and undulating air currents, thus preventing the build-up of amplitude. They are readily installed with hot line tools without service interruptions or disturbing existing suspension or dead-end clamps. For complete details write for your copy of Bulletin 22 *today*.

HUBBARD

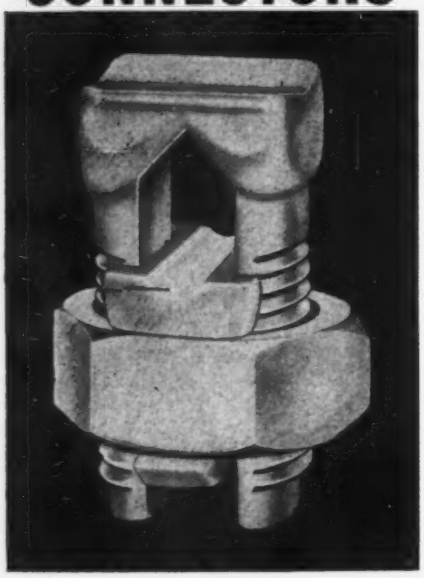
Hubbard and COMPANY

OAKLAND, CAL. PITTSBURGH CHICAGO

HUBBARD

HANG THE LOAD ON HUBBARD HARDWARE

MATTHEWS NUTYPE CONNECTORS



High strength materials and close tolerances of all parts make these connectors exceptionally strong. They will accommodate two or more copper wires from 10 solid or smaller to 1000 MCM strand inclusive. Connectors up to 1/0 strand inclusive, have pure cold forged bolts and clamping jaws and nuts are of 98% copper content hard metal alloy. The 2/0 and 4/0 connectors have machined bolts and nuts of 95% copper content high tensile strength alloy. Connectors for 350 to 1000 MCM strand are of cast hard durable alloy having high conductivity.

Plated connectors for aluminum or steel wires and with bimetallic washers for connection with copper wires are also available.

Nut retainers can be furnished on connectors for 6 solid wire to 1/0 strand inclusive.

Write for Bulletin 206

W. N. MATTHEWS CORP.
3722 FOREST PARK BLVD.
ST. LOUIS 8, MO.

BULLETINS

data books, etc.

Circuit Breakers (1228)

Allis-Chalmers describes its "Unitop" circuit breakers in Bulletin 7186421, recently off the press. According to the manufacturer, these units were designed to meet the latest a-c power circuit breaker standards in ratings 15 to 46 kv., 500,000 to 1,500,000 kva. interrupting capacity.

Heat Control System (1229)

A consumer booklet describing the company's "Moduflow" automatic heating control system has been published by Minneapolis-Honeywell. This booklet discusses applications to radiant panel, solar and electric heating and air conditioning, as well as to such methods as steam, warm air and hot water.

Lighting Ideas (1230)

"Bright Ideas to Put Your Home in a Favorable Light," by Effa Brown, is a small-sized 16-page booklet of do's and don'ts in home lighting. This attractive booklet is published by Sylvania.

F Catalog (1231)

Day-Brite has issued bulletins covering revised listings of its Viz-Aid and Topnotch fluorescent lighting fixtures. Introduced is the new "A-J" adjustable stem hanger for continuous installations.

Transformers (1232)

Standard Transformer Co.'s Bulletin S-401-A has been reprinted. It describes the company's oil-immersed distribution transformers and includes new tables and data.

Distribution Duct (1233)

BullDog Electric Products Co.'s Bulletin 462 describes that company's feeder and plug-in BUStribution Duct. Illustrated with photos and diagrams.

Insulation (1234)

Temperature-resistance characteristics of electrical insulation are treated in Technical Publication 21T4, prepared by the engineering staff of James G. Biddle Co. Available information has been assembled and correlated, with no attempt to prove or disprove it, the company states.

Radio Performance (1235)

First details on circuits and performance characteristics of Westinghouse radio receivers, Models H-104, 105, 107, 108, have been published by the company in an eleven-page booklet.

Replacement Elements (1236)

St. Clair Electric Products Co. is offering a bulletin covering major specifications and prices of its replacement elements for flat irons and room heaters, its standard types of hot plates and replacement coils for electrical toasters, etc.

Thermal Relay (1237)

The Edison Model 501 thermal relay is described in a new bulletin from the instrument division of Thomas A. Edison Inc.

Buying Guide (1238)

"Buying Guide of Allis-Chalmers Equipment for the Process Industries" is a 16-page booklet aimed at helping the reader in making a preliminary selection of the company's industrial products.

Testing Lab (1239)

Benjamin Electric Mfg. Co. describes its new testing and development laboratory in a 16-page bulletin recently released.

Underground Cable (1240)

A revised catalog of its Anhydrex rubber-jacketed underground cables has been released by Simplex Wire & Cable Co.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

1200	1201	1202	1203	1204	1205	1206	1207	1208
1209	1210	1211	1212	1213	1214	1215	1216	1217
1218	1219	1220	1221	1222	1223	1224	1225	1226
1227	1228	1229	1230	1231	1232	1233	1234	1235
1236	1237	1238	1239	1240				

Name..... Company*..... Title*.....

Address.....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

SORGEL AIR-COOLED TRANSFORMERS

¼ KVA
Single Phase
460/230 to
115 volt

15 KVA, 3-Phase
Wall Mounting Type

Large Variety of Sizes and Types

¼ to 1000 KVA. All Voltage up to 13,200

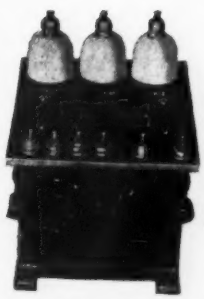
Insulating	Single phase
Auto	Poly-phase
Booster	Phase changing

Enclosed types for installations in buildings.
Open types for assembly with other equipment.
Standard voltages. Special voltages.
Step-up or Step-down.

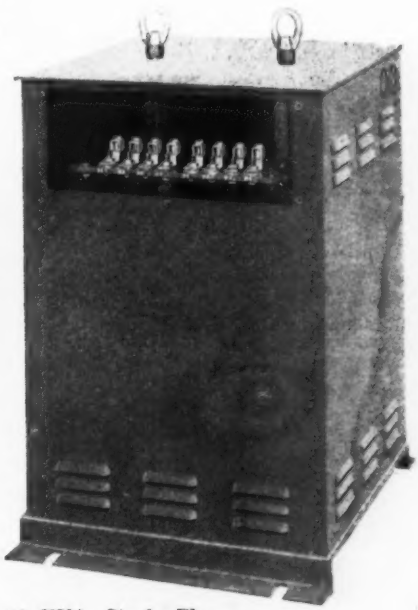
5 KVA
Wall Mounting Type

25 KVA, Single Phase
460/230 to 230/115 volt
Wall Mounting Type

80 KVA, 3-Phase
6000/10400 Volt
Induction Heating Transformer



Special
Electronic Device
Transformer



50 KVA, Single Phase
Floor Mounting Type
With cover of connection compartment removed, showing solderless terminals

REPRESENTATIVES

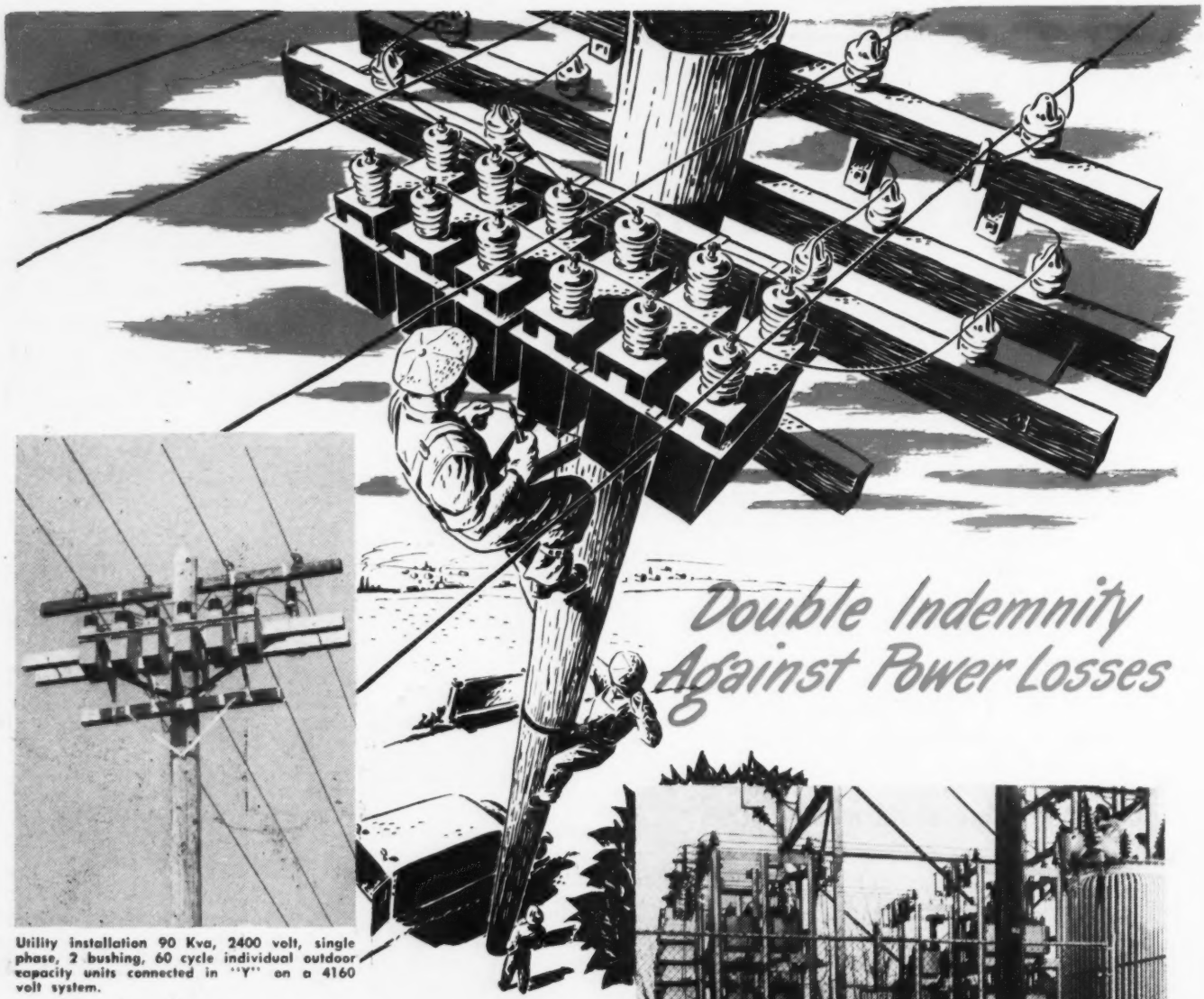
FRED W. CARLSON
307 Wall, Seattle, Wash.
Portland, Oregon

CAMPBELL & GEORGE CO.
379 Brannan St., San Francisco

H. D. EASTERBROOK
1262 S. Boyle
Los Angeles 13, Calif.

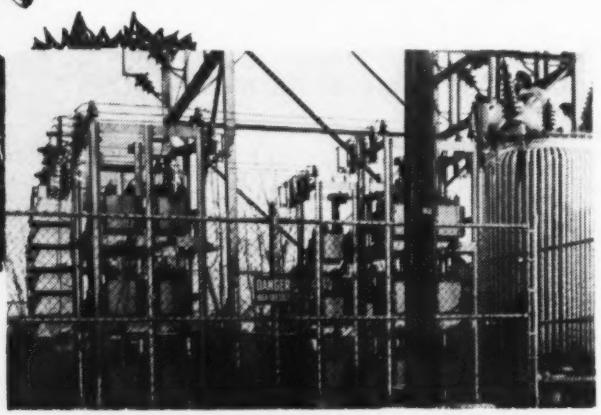
SORGEL ELECTRIC CO., 844 W. National Ave., Milwaukee 4, Wis.

Pioneers in the development and manufacturing of Air-Cooled Transformers



Double Indemnity Against Power Losses

Utility installation 90 Kva, 2400 volt, single phase, 2 bushing, 60 cycle individual outdoor capacity units connected in "Y" on a 4160 volt system.



Utility sub-station installation of 1440 Kva of 15 Kva, 2400 volt, single phase, outdoor capacitor units, mounted in special 360 Kva framework.

ADAPT C-D CAPACITORS TO CRITICAL LOAD POINTS

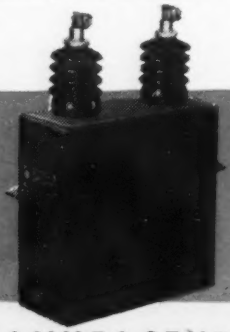
Easily installed on poles or in banks for large blocks of reactive, C-D capacitors provide an economical and flexible method for increasing load-carrying capacity. C-D power-factor capacitor banks can be split up or interchanged quickly to benefit the entire system or any critical section.

All C-D capacitors are constructed to NEMA specifications and offer the greatest safety factor obtainable. Units discharge completely within specified NEMA time requirements.

Weather-tight and sturdily built to withstand years of abuse, C-D capacitors are widely endorsed by leading power engineers throughout the country. Write for technical data or consult your local C-D field engineer for power-factor correction estimates. Cornell-Dubilier Electric Corporation, South Plainfield, New Jersey. Four other large plants in New Bedford, Worcester, and Brookline, Massachusetts; and Providence, Rhode Island.

CORNELL-DUBILIER CAPACITORS

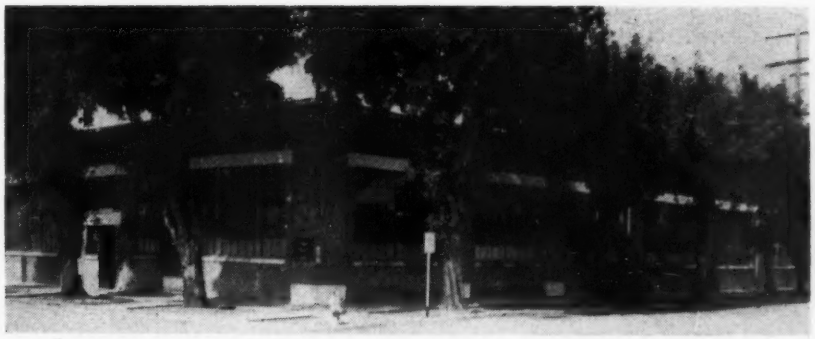
For Power-Factor Improvement, Carrier-Current Coupling, Surge Protection



Write for free copy of C-D Vector Chart which shows how to determine capacitor KVAR required to increase power-factor to any desired value. Also contains useful formulas and power-factor improvement table. You will find it a valuable aid in solving most power-factor problems.

WORLD'S LARGEST MANUFACTURER OF CAPACITORS

ANACONDA
from mine to consumer

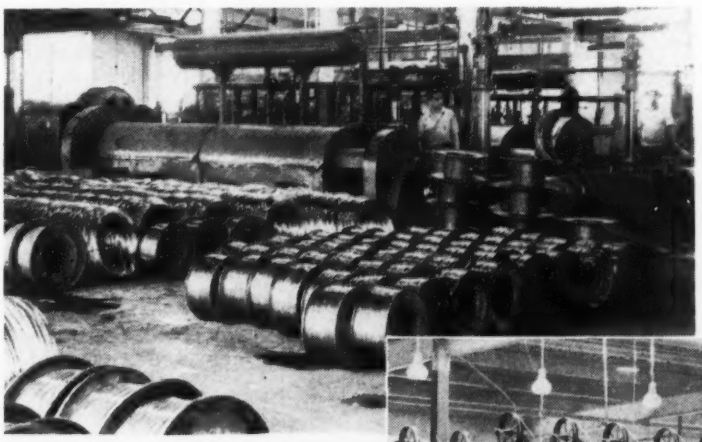


Main building of Mill at Orange, California

ANACONDA WIRE & CABLE COMPANY

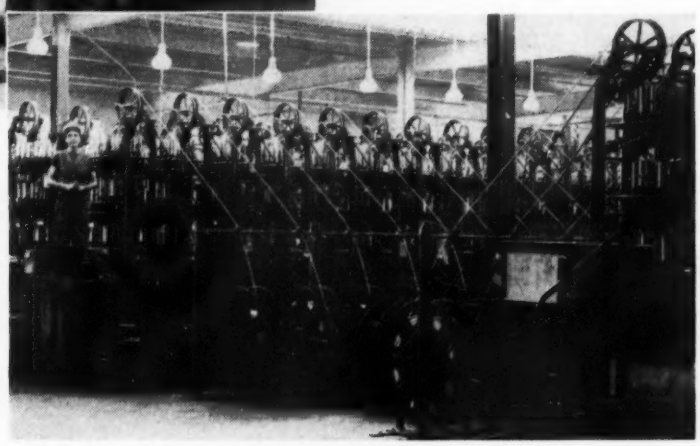
Right here, on the Pacific Coast, the ANACONDA mill at Orange, California is our principal source for—

BARE AND WEATHERPROOF
WIRE and CABLE
COPPERWELD-COPPER CABLES



At Great Falls, Montana, the rolling mill produces the rods from which bare wire is drawn . . . for use on the Pacific Coast

Wire Drawing Operation



Weatherproof Wire Braiders

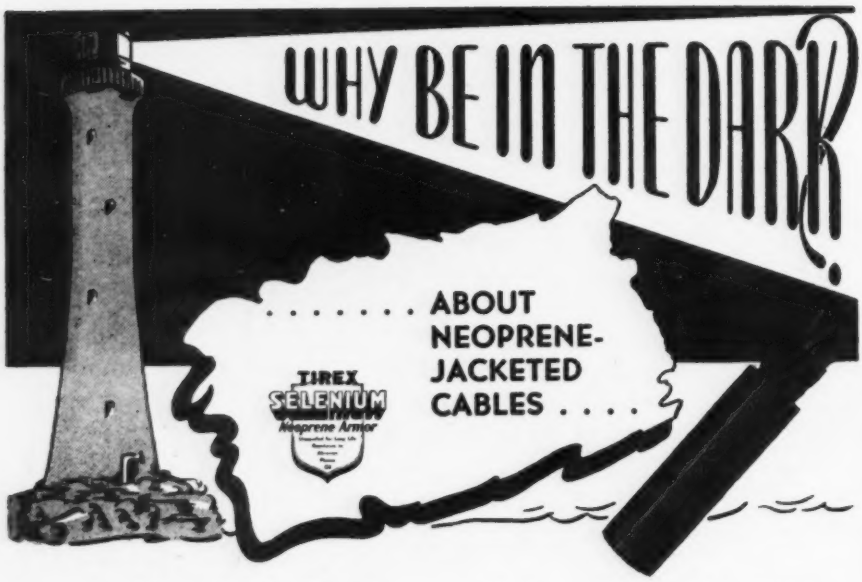
All eleven Offices and Warehouses of the GENERAL ELECTRIC SUPPLY CORPORATION on the Pacific Coast are a dependable source of supply for—

ANACONDA BARE and WEATHERPROOF WIRE & CABLE

DISTRIBUTORS ON THE PACIFIC COAST

GENERAL ELECTRIC
SUPPLY CORPORATION

SAN FRANCISCO • OAKLAND • SACRAMENTO • FRESNO • LOS ANGELES
SAN DIEGO • PHOENIX • SEATTLE • PORTLAND • TACOMA • SPOKANE



Mr. Cable-Buyer, you know that Neoprene jackets add long years of economical, trouble-free service to power cables, but, do you realize that all Neoprene jackets are not alike; that they vary both physically and chemically?

A recent issue of DuPont's Neoprene Notebook published this statement about Neoprene compounds:

"The properties obtained depend on how the product is compounded and upon the method used for its manufacture. The best Neoprene products are made by the best rubber manufacturers."

Since the first Neoprene-armored TIREX* Cords and Cables were produced, Simplex has been aware of this. Confidently, we offer our outstanding record in the development of rubber compounds, and our expertly-staffed research laboratories as your assurance that every TIREX Cord and Cable you buy is furnished with a Neoprene armor of unsurpassed quality.

In no other cable will you find greater resistance to the dangers of sunlight, oil, flame and abrasives. From no other cable will you get more dependable day-in, day-out performance yet at less cost per hour of operation.

When you next buy, be sure to specify Simplex-TIREX, the only cords and cables with the famous Selenium-Neoprene Armor.

*Trade Mark Reg. U.S. Pat. Off.

Simplex-WIRES & CABLES

SIMPLEX WIRE & CABLE CO. 79 SIDNEY ST. CAMBRIDGE 39, MASS.

BOOKS

you may want

MATHEMATICAL AIDS FOR ENGINEERS, by Raymond W. Dull, 346 pages, McGraw-Hill Book Co., $4.50.

A running analytical discussion quickly orients the reader at whatever point he happens to wish to enter this book. For example, he may look at Chapter II, "Logarithms as an Implement" and find definitions, development and a section on "The Slide Rule." Or, on a more complex level, he may turn to the chapter on "Differential Equations of the Second Order" and find a section on "The Electric Circuit with Inductance, Capacitance, and a Sinusoidal Current Added." As the mathematics are discussed, their applications in various fields of engineering are illustrated. The book endeavors particularly to equip engineers with those mathematical aids most needed in meeting engineering developments of the last few years.

ELECTRIC MOTOR REPAIR, by Robert Rosenberg, 308 pages of text, 243 pages of illustrations, 6x9, double spiral binding, Murray Hill Books, Inc.

This volume is especially designed for shop use and does a thorough job of explaining repair procedure for both a-c and d-c motors without becoming involved in electrical theories. It takes the position that the man using it will need to have only a little electrical background. The double binding makes it possible to open the book as though it were two volumes so that the text and corresponding illustrations (there are 900 illustrative drawings) may be viewed at the same time.

LAMP BULLETIN, by C. E. Weitz, 76 pages, 8x11, paper, spiral-bound, G-E Lamp Dept., 40c.

Skims the cream of a variety of bulletins and articles published by the G-E Lamp Dept.'s Engineering Division. The result is a condensed text on the design and operation of incandescent, mercury and fluorescent equipment. Included are graphs of the spectrum in full color, with eye performance and response data incorporated. Also contains photographs and data on virtually the full line of G-E lamps. Identified as G-E Bulletin LD-1.

FLUORESCENT SERVICE AND MAINTENANCE MANUAL, pocket size, 78 pages, by Sylvania Electric Products Inc., $1.

Covers trouble shooting, testing procedures and cleaning methods, with some extra information on principles and a glossary of terms. The manual is intended for contractors, wholesalers, lighting engineers and electricians. The essential information is presented simply, with many illustrations and diagrams.

POWER LINE CARRIER EQUIPMENT, 39 pages, 8x11 in., spiral bound, paper covers, by Westinghouse, $1.

Describes applications in general, and describes and illustrates Westinghouse equipment of the subject type with reference to its applications in relaying, telemetering, load control, remote trip and emergency communication. Intended for, and principally of value to, those directly concerned with making these applications.

B
A C
OF SCRAP and THAT STEEL YOU WANT
IN THE OPEN HEARTH FURNACE, A TON OF SCRAP
CAN REPLACE A TON OF HOT PIG IRON...AND
HERE'S WHAT IT TAKES TO PRODUCE PIG IRON
IRON ORE
IRON ORE
COAL
LIME-
STONE
HOURS OF BLAST FURNACE TIME
HOURS OF BLAST FURNACE LABOR

To you "scrap" may be just worn-out machinery, broken pipe and such junk---worth nothing to your business.

But it IS worth a lot to your business delivered to the steel producer. Scrap may be the means of supplying you with more of the new steel and steel products you want.

As every buyer knows, steel is produced by "blending" hot pig iron and scrap in the open hearth furnace. Each ton of available scrap can replace a ton of pig iron. The greater the shortage of scrap, the heavier the drain on pig iron supply to produce a given tonnage of steel.

But every extra ton of pig iron produced calls for the use of approximately two extra tons of iron ore, one extra ton of coal and one extra half-ton of limestone, processed in a blast furnace, involving many extra hours of time and labor. It is obvious that there is a limit to America's blast furnace capacity. So the quickest, most effective way to produce maximum steel tonnage now is to find and use more scrap.

Help yourself to more steel by starting more scrap into the channels that serve the mills.

QUALITY V YOUNGSTOWN SERVICE

YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

GENERAL OFFICES - YOUNGSTOWN 1, OHIO

Export Offices - 500 Fifth Avenue, New York City

Manufacturers of

CARBON - ALLOY AND YOLOY STEELS

Pipe and Tubular Products - Sheets - Plates - Conduit - Bars - Electrolytic Tin Plate - Coke Tin Plate - Rods - Wire - Cold Drawn Carbon Steel Rounds Tie Plates and Spikes.

ELECTRA'S HUSBAND

Danger Signals Flying

"MRS. JONES told me today that she had cancelled her order for a new washing machine," Electra said, looking up from her mending one evening recently. "The Browns aren't buying a new car either."

"Why the sudden economy wave?" I asked, laying aside the copy of *Science Illustrated* which I had been reading.

"Prices are too high," Electra answered. "Mrs. Jones says her old washer will simply have to do because she won't pay the increase just announced. And the $100 boost in car prices put the same ideas in Mrs. Brown's mind."

"If their reactions are typical, and if John L. Lewis is successful in his latest round of the rule-or-ruin game, then the danger signals are flying," I mused. "We'll get the bump the forecasters have been talking about. And that will be a darned dirty shame because never in the history of the country have there been so many forces at work to make our economy thrive—unfulfilled needs, backed by both the money and the desire to meet them."

"Maybe we oughtn't to get the new radio and the new bedroom set," Electra said. "If we're going to have any kind of a depression, let's start economizing now."

"I didn't say depression, I said bump. There's a difference. A bump is only a 15 or 20% sag in business and production. A depression means that both go off 50% or more. You needn't start worrying about trimming expenses. You've saved the money anyway, haven't you?"

"Yes, but we may want it for something else," she answered. "What's back of this talk about a slump anyway?"

"Well," I replied, "there are a lot of things. One is the abandonment of price controls after they had just about collapsed anyway. Another is the failure of production of many lines of heavy goods to get rolling—automobiles for instance. And don't forget what happened to the stock market. About eighteen billion dollars of paper value were wiped out when the averages went down 25%. The last thing is the way unbalanced inventories are piling up, but you wouldn't understand that."

"Sometimes I think you married me just to have someone to argue with," Electra said heatedly. "Certainly I know what an inventory is and when it is unbalanced. I'd like to get a little unbalance in my inventory of soap and toilet tissue. But go on with your thesis."

"No, I'll sum my little story up in a hurry," I said, not relishing a hot argument. "The cost of living, mainly higher food costs, has generated pressure to force wages upward. Because it takes more money to buy food, the sales of a lot of other consumer goods are suffering. The stock market drop put the same kind of a blight on the purchase of luxury goods. And it could also hurt some of the expansion plans of business and industry. Add to those things the trouble big industry is having to get moving in high gear and all of the pains that the so-called building boom is having, and you find many of the elements of a good swift kick in the pants for business. If John Lewis and his rivals really succeed in shutting the country down again for any considerable period of time, we will get a slump and soon."

"Doesn't it seem silly for everyone to sit around predicting dire things without trying to do something?"

"On the surface it does," I said. "But the causes have developed to such a point that very little can be done now. It's like saying 'I won't break my leg' just after you have slipped off the roof. Our immediate economy is already falling. As a long-range proposition, a lot of things can be proposed and some of them initiated. Labor and management can decide to get along together for their mutual benefit and for the welfare of the whole people. We can get rid of a lot of bureaucrats, together with the business-choking controls and regulations they cherish. Finally we can get along together as people instead of as classes and pressure groups and political advocates."

"And if we don't?"

"Goodnight."

ELECTRA's sister has had an intimate experience with bureaucracy. Early in the war her family bought a house and one of her pet postwar projects has been the modernization of this home. But equipment and material shortages have caused one postponement after another. However, one minor step in the modernization program became absolutely essential. The hinged covers of that monumental example of the plumbing art which distinguishes indoor from outdoor plumbing completely fell apart.

Efforts to replace that essential element proved fruitless because CPA had certified her need as non-essential.

Just to show her that others suffer from the same type of insanity Electra has sent her a copy of a ruling which the *New York Times* called "a gem of British bureaucracy":

"Making of Civilian Clothing (Restrictions) Order, 1942

(S.R.&O. 1942. No. 541)

"I am to refer to your letter dated 1st March in which you make application for a license to permit of a suit being made having more pockets than those laid down in the above-mentioned Order.

"It is noted that you do not require more than two pockets in the trousers, and that you would like, instead of the third pocket, to have an extra one in the jacket. I am to say that the Board are not prepared to consider the giving up of a pocket in one garment sufficient reason for the granting of an extra pocket in another garment, since the restrictions are imposed on the separate garment and not on the suit as a whole.

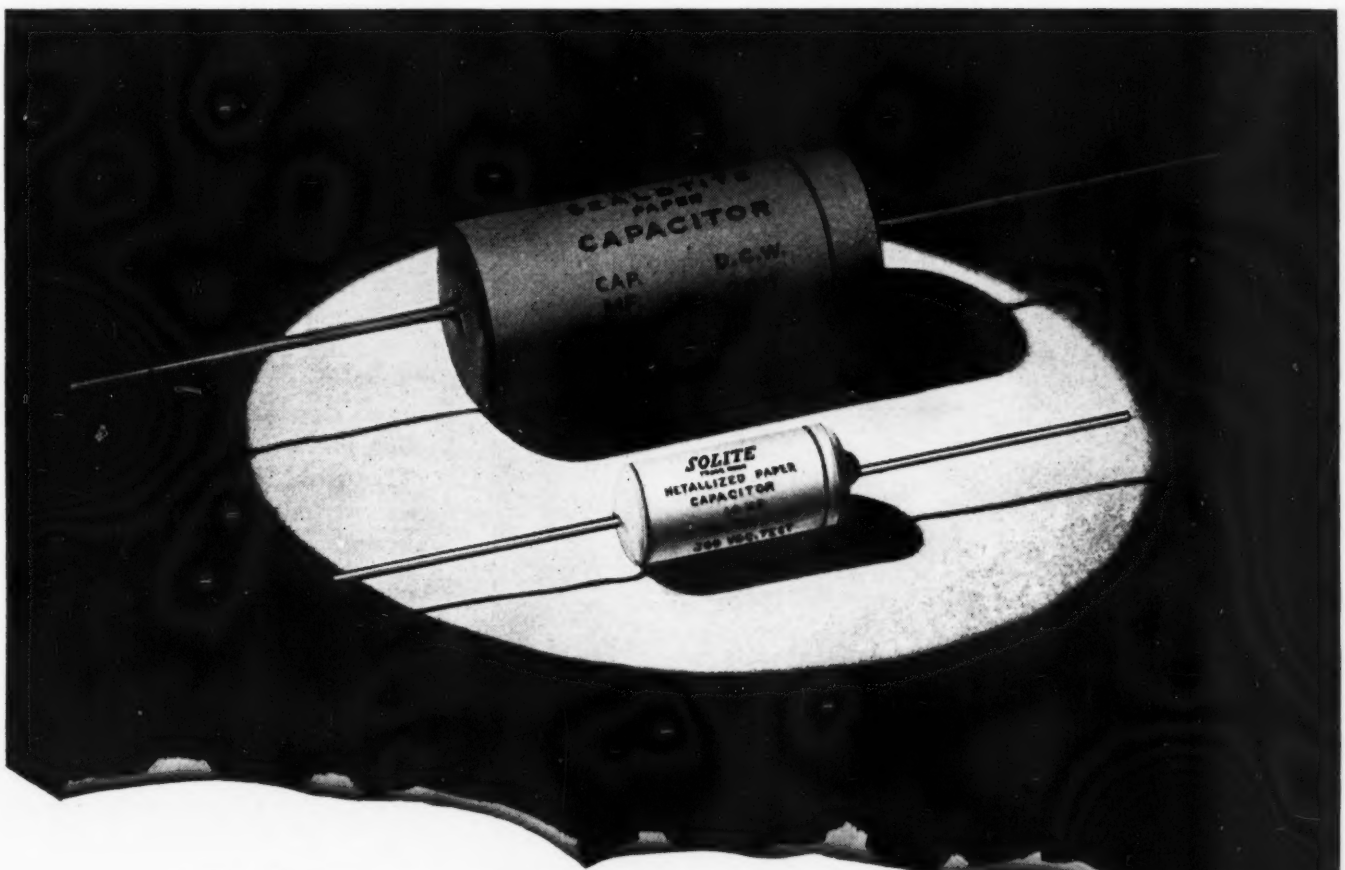
"The Board realize, however, that in certain circumstances it may be necessary to vary the restrictions and if you would state why you are unable to make use of the third pocket in the trousers (it is not necessary that this pocket should be a hip-pocket, the restrictions do not in any way refer to the position of pockets but only to the total number in each garment), thus necessitating the extra jacket pocket, full consideration will be given to the issue of a license. It would also be helpful if you were able to state the exact use to which the extra pockets you require in the jacket and waistcoat are to be put.

"With regard to your request for a small subdivision in the right side pocket of the jacket, I am to say that this is not regarded as an extra pocket and that no license will therefore be necessary in respect of this requirement.

"The name and address of your tailor should also be stated in order that if a license is issued it may be sent to him."

SOLITE★

NEW AND SMALLER PAPER CAPACITORS



Solar announces

SOLITE* **Metallized Paper Capacitors**

Truly revolutionary are these miniature capacitors, one-third to one-fourth the size of conventional paper tubulars. *SOLITE*★... latest triumph of war research... new in every way—made by an entirely new process—introduces a new concept of compactness to electronic product designers, a new idea of installation ease. Ask for *SOLITE* details.

Solar Manufacturing Corporation, 285 Madison Avenue, New York 17, N.Y.

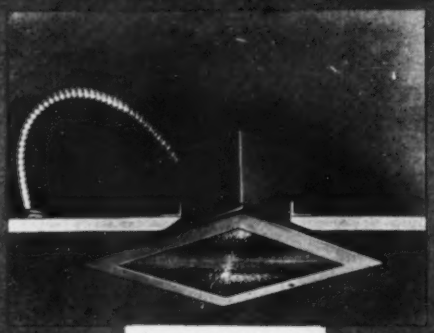
© 1959

★ **Trade Mark** Solite Capacitors are fully protected by U. S. letters patent and patents pending.

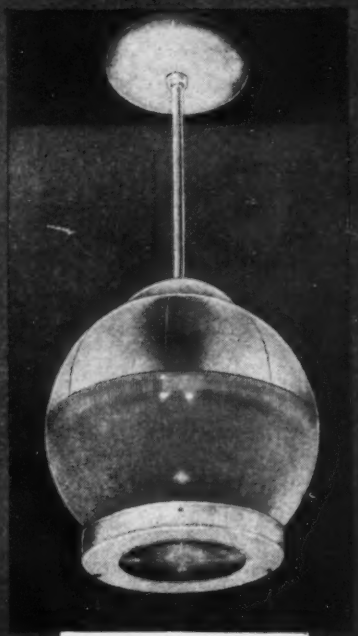
SOLAR

SOLAR CAPACITORS
"Quality Above All"

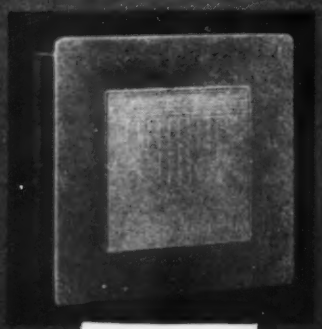
HOLOPHANE RESEARCH OFFERS *Specialized* LIGHTING for every area of the modern hospital



A—Psychiatric Unit



B—Medical Examination Unit



C—Night Light Unit

E—Vapor-Tight Unit

D—Twilight Unit

FOR nearly half a century Holophane Research has concentrated on the development of proper lighting for every phase of hospital activity. The success of these efforts is indicated by the fact that so many modern hospitals are equipped throughout with Holophane lighting. Based on scientific principles of light control Holophane specifics are engineered for maximum efficiency at minimum operating cost.

A—Psychiatric Units . . . flush with ceilings or walls; mechanically strong, featuring Hi-Stress (impact-resistant) Controlens; can be opened only with special implement; dirt-tight; take regular lamps (60 to 200 watt); have auxiliary lamp for night light.

B—Medical Examination Unit . . . contains two distinct optical systems: (1) for general illumination; (2) for special examination by the use of iris shutter device enclosed in smooth crystal sphere.

C—Night Light Units . . . Installed near floor, preferably under bed; extra shallow housing; take small 7 watt lamp for low even floor light without annoyance to patient.

D—Twilite Units . . . suspension or close-ceiling types; each contains 150 or 200 watt lamp—enough for reading, etc.; also equipped with two 7 watt lamps—enough for nurse's activities, too little to disturb patients.

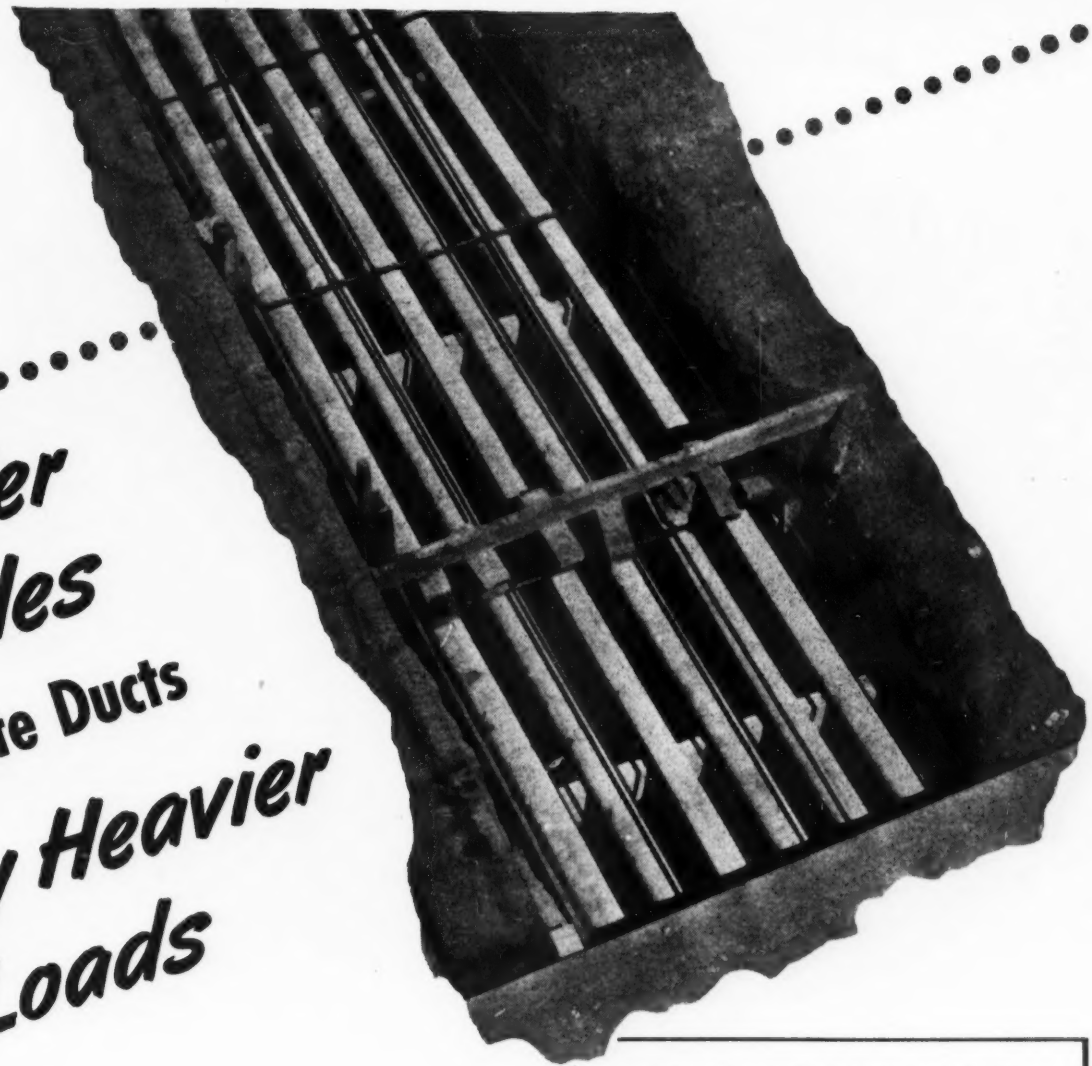
E—Vapor-Tight Units . . . for Laundry, Dish Washing, Truck Washing, Kitchen and like areas; water-tight and corrosion-resistant; wide range of wattage and variety of distributions assure economies in operation.

WRITE FOR your copy of Holophane's comprehensive book devoted to hospital illumination: *"Lighting for the Hospital of Today"*; available without obligation.

HOLOPHANE COMPANY, INC. . . . *Lighting Authorities Since 1898*

342 Madison Avenue, New York 17 • Holophane Co., Ltd., 385 Yonge St., Toronto, Can.

Cooler Cables in Transite Ducts Carry Heavier Loads



Increases of as much as 15% in current carrying capacity have been measured in cables sheathed in Transite Ducts!

The figures in the test case illustrated, made by Johns-Manville Research Engineers in collaboration with several leading cable engineers, apply to a single Transite Duct compared with an organic duct.

Transite Ducts have been proved to dissipate I^2R losses 13% faster than other ductways tested, thus keeping cables cooler. Higher load capacity, reduced copper losses and increased cable insulation life are the results.

Made of asbestos and cement, Transite Ducts are strong, immune to rust and rot. They are incombustible and unaffected by electrolysis or galvanic action. A permanently smooth bore makes possible long cable pulls and easy replacements. Long, lightweight lengths can be quickly and economically installed. In addition, a full line of fittings simplifies even the most complicated installations.

HOW TRANSITE DUCTS INCREASE CABLE CARRYING CAPACITIES

Tests made on a lead-sheathed 500,000 CM cable insulated with ½" paper and placed inside a single duct encased in concrete.

Sheath Temperature, 145° F.
Ambient Air Temperature, 90° F.

CURRENT CARRYING CAPACITY

Transite Duct	796 amperes
Organic Duct	691 amperes
Difference	105 amperes

(Figures are results of tests conducted in the J-M Laboratory in collaboration with several leading cable engineers.)

For full information on Transite Ducts, write for Data Book DS-410. Johns-Manville, Box 290, New York 16, New York.

Johns-Manville TRANSITE DUCTS

CONDUIT for use without concrete
KORDUCT for concreting in

IT TOOK A CUSTOMER TO SHOW ME SALES I WAS MISSING

Contractor: I hear you're having a hard time with your new housing development. I suppose wiring is going to take a beating.

Builder: No – I don't think so. Cutting the wiring to the absolute minimum won't save enough to make it worth while. I have a reputation for building up-to-date homes, you know, not houses that are obsolete before the paint is dry. I want to protect that reputation.

Contractor: You mean to say that you will insist on a real adequate wiring job even in your low-cost houses?

Builder: I sure will. In my low-cost houses I'll have to omit some of the extras that people want. But small home owners use just as much electricity as people who live in large homes – even more maybe. And I sure won't leave out anything as essential as a sound wiring system.

Contractor: I'm real glad you feel that way. And I'm sure that good wiring will not only help to sell your houses, but will keep the owners satisfied as long as they live in them. That's a selling idea I'm going to start pushing right now.

P.S. **Why not ask *your* G-E representative how you can benefit from the promotion of adequate wiring in residential, industrial, and other buildings. Or you may want to write for information to Section AW-16-1218, Appliance and Merchandise Department, General Electric Co., Bridgeport, Conn.**

GENERAL ELECTRIC

ADEQUATE WIRING SERVES AND SAVES — THE KEY TO THE HOME OF TOMORROW

ELECTRICAL WEST

DECEMBER 1946
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Being Decent Pays Good Dividends

A lot is written about human relations—most of it general. Here, in a message that is timely at the season of Christmas and New Year's, with its plans for the future, are some practical aspects of it

R. D. Horning*
Manager, Seattle Electrical Contractors Assn.

WITH all the conflicting reports throughout the world, and our labor difficulties at home. we lose confidence at times. I would, therefore, like to discuss a subject, the basic principles of which have restored confidence to the electrical contractor and given him faith in the future — "Human Relations in Business."

When we lose confidence, we should remind ourselves that the U.S.A. has a wealth of factories and machinery, the know-how to operate them, a wealth of natural resources, and an abundance of labor to make these fac tories hum. On the other hand, we know many of these factories are not humming today. There is a reason for this paradox, and I believe it lies principally in our approach to the human side of business. Human relations in business constitute the most powerful force for good in the world today when properly used. When good human relations exist between management, labor and the public, most strikes are eliminated, sharp business practices disappear, customers are welded to us, production increases. and profits are assured. As you know, human relations in business embrace labor relations, industry relations, and public relations. I will try to show how they have been applied to the construction and electrical contracting industry in Seattle, and the results procured.

It seems to me that the key to successful human relations in business is outlined by the simple formula of (1): *Channel all thinking in the terms of the welfare of the whole;* (2) *being decent, whether others are decent or not.* Now let's look at these principles and see if they work in a practical, realistic world, in a world of selfishness and greed, in a world where the law of the jungle, covered only by a thin veneer, is still practiced by some men in business.

About ten years ago the building industry in Seattle decided that the law of the jungle was unprofitable, sharp business practices did not pay dividends, that strikes were costly both to labor and management, so labor and management decided to do something about it. Twelve men got together, six from labor and six from management. From that time on, until the present, all disputes either of labor or of management came before this board. These twelve men have been decent for ten years, whether others were decent or not. They have channeled all their thinking in terms of the welfare of industry, labor and the public. There have been no strikes or lockouts during this period. There will be none as long as they follow these principles.

Now let us see what the electrical contractor did during this same period. He was willing to try these two theories, but he felt that he had a more complex problem. The first of the principles was basic, but the second had to be defined in terms of what is decent. We therefore wrote fifteen pages defining decency in the electrical contracting industry. From this beginning we have carried on throughout the years with the result that we scarcely ever refer to the fifteen pages of proper conduct.

The electrical contractor today feels that he is a part of the electrical industry and believes that he has an important part to play in its future. Some of our other activities in relation to other branches of the electrical industry which include the distributor, the manufacturer, and privately owned power companies prove this.

Some five or six years ago, the electrical contractor felt that the distributor was ignoring the contractor's problems, that his sales policy was sketchy to say the least, with the result the contracting branch of the industry suffered. The suffering created heat, and the heat created bad blood toward this branch of the industry. Many of the larger contractors were convinced that they could not cope with this situation unless they made direct connections with manufacturers in the East, thereby by-passing the distributor. This feeling had gone so far that two of our group made trips East with the primary purpose of making these direct connections. It looked as if there was going to be a fight in which all members, as well as distributors, were going to get hurt. About this time, a resolution was passed in our association reversing our thinking. This resolution read something like this—"*In the future, the members of this group will buy no material for the fabrication of their jobs unless this material comes through a recognized distributor.*" This reversal in our thinking was a trial balloon but in keeping with the principles that we had laid down some years before in our own group. We were now thinking in terms of the welfare of the electric industry—being decent whether others were decent or not. When I told the jobbers what we had done, a change of attitude towards the contractor was instantaneous. I told one

*Presented at the industry forum session of the Northwest Electric Light & Power Assn., Business Development Section meeting in Portland last spring.

It seems to me that the key to successful human relations in business is outlined by this simple formula: (1) Channel all thinking in terms of the welfare of the whole; (2) be decent whether others are decent or not

of them to bear in mind that we were not asking him for anything. His reply was most gratifying, and was about as follows: "I know you are not asking us for anything, but we know what you want." It is needless to say that since that time, *we have had the finest jobber-contractor relations in the history of the contracting industry.*

One or two experiences that relate to the electrical manufacturer are worth noting, not with the idea of criticism, but with the thought of emphasizing the contractor's viewpoint. Sometimes we do things, not with the idea of being indecent or of hurting another branch of the electrical industry, but we do things sometimes without thinking, with the result that they do hurt some branch of the industry, and the public as well. For example, a few months ago, I had placed on my desk a beautiful folder by one of the national manufacturers. The art work was of the best, many pictures and sketches were contained in it and the subject was "Rural Electrification for the Farm." This booklet contained pictures of all the gadgets necessary to wire the farmer's barn and house, the principal theme being how easy it is for the farmer to do this work. I'm not going to approach this matter on the basis of the small electrical contractor living and raising his family in these small communities, but approach it from the standpoint of the electrical manufacturer. It has only been a few months since a well-known electrical engineer in this Northwest country visited his sister in Kentucky and was electrocuted while he was in the process of hanging a new fixture in her home. It seems impossible this could happen to one familiar with the dangers of electricity, but still a national manufacturer tells the farmer how easy it is to wire his barn and house. Is the manufacturer taking the responsibility of burning down these buildings when he tells the farmer how easy it is to wire them? I don't think so. There are qualified men in these communities that do this work. Why don't the manufacturers work with them? They are also a part of this industry.

Here are two illustrations which effect the great power industry. Some months ago a small three-mile extension in an isolated district in our territory came up for bids. This power extension had been promised for four years and it affected forty families, but due to the war it was impossible to make this extension until last year. When this matter came up for bids, one of the power company men called me, stating that this extension exceeded their estimate and wanted to know what to do about it. My answer was that we had four reliable contractors who had bid this job, who had been told prior to the job's going in that this was a cooperative effort between the power company and ourselves to see if we could not do these extensions as cheap and with greater dispatch than the power company itself. With this in mind, these contractors had really sharpened their pencils and I was personally convinced that the power company's estimate was wrong. However, in order to find out who was correct, I could see no other way to approach it except for the power company to make this extension. The holes were dug, the poles and crossarms were put on the site and it looked as if, within a couple of weeks, this line would be energized and these people, who had waited four years, were going to have electricity. Three months passed and no one seemed to know why the delay. The community began getting hot under the collar, calling the power company many names. I was asked to look into it and we found that the delay was due to a rush line job for the Naval Ammunition Dump and that this project would be completed within two weeks. The question in my mind was why couldn't the office manager tell these people the reason for the delay. Why weren't the people in this community advised some three months before that there would be a delay and that the company, as a servant of their community, was as disappointed as they undoubtedly would be. It seems to me such instances fertilize the soil for the growth of public power. From the contractor's point of view there are sometimes more important considerations than price.

To cite another example, some months ago a certain community of 2,500 population decided that it would beautify its main street by installing street lights along its principal thoroughfare. The community had approximately $19,000 to complete such a project. It brought in an electrical contractor to make an estimate. This electrical contractor was one that had done much street lighting work in the state of Washington and his estimate was approximately $15,000. At this time a representative of the power company was brought into the picture and he informed the city fathers in this community that it was not necessary to move the light poles into the alley as had been proposed by the electrical contractor, but they had a number of used reflectors in their warehouse and that they could put in this street lighting on the existing poles for approximately $750. The project is dead. Here's a community that could have been a show place for the power company. Other communities could have been brought in to see how a small city could be beautified with street lighting. Had the power company been cooperating fully with the electrical contractor, it would have known that there was something involved rather than just the illumination of a street. There are times when load building is not the major consideration involved.

Another case occurred in the matter of lighting a baseball and football field. In a community only a few miles from the one just cited, the power company told the school district that this field could be lighted on the plans submitted for approximately $8,000. This money was appropriated, bids were called for the project, and the low bid was approximately $13,000. On investigation, it was found that the material on this job alone was nearly $8,000. A qualified contractor could have told the power company that its estimate was too low. The school district still wanted the field lighted, made an additional appropriation and the job was done.

Bear in mind these instances happened in a district where the power company is cooperating with the electrical contractors. There seems to be a gulf between the thinking of the sub-executives and the executives that mold the policy of the company. Channeling all thinking in terms of the welfare of the industry would change this condition.

This great electrical industry is growing up. It has grown by leaps and bounds during the past twenty years. Sometimes I think it has grown faster than our thinking. We *are* living in a changing world and our thinking must change with it. Every branch of the electrical industry must be considered in our future policies. This may be a revolutionary thought in some of our minds, a revolutionary thought however that is permeating the minds of millions of people today, who are trying to *"Channel their thinking in terms of the welfare of all"* and *"Be decent whether others are decent or not."*

Utility Radio Gets FCC Go-Ahead

G-E PHOTO

A GREAT new field for radio in utility operations has been opened up by new FCC rules. By applying to FCC and securing license under the new Utility Radio Service classification, power utilities may transmit communications essential to operations in connection with generation, production, transmission or distribution, or with maintenance of transmission or distribution facilities, as well as those communications essential to public safety or the protection of life or important property.

This wipes out the "emergency" requirement of previous policy and is part of a broadminded FCC effort to expedite the solution of utility communications problems. It is an interim measure coupled with temporary frequency assignments. Final rules may be expected to come along with final frequency allocations, which complicated subject is still being studied.

Details of the new policy follow a recent Chicago meeting of the Power Utility Committee of the Radio Technical Planning Board (RTPB), which is the body formed some time ago to represent user and technical viewpoints in dealing with FCC. Representing the West on the PU Committee as an executive committeeman is C. T. Malloy, Southern California Edison Co.

Basis of the new policy is to be found in two FCC documents. Docket Proceeding No. 6651, following from an extensive study of the frequency allocation problem, sets forth a general distribution of frequencies to the various non-government services. FCC "Rules and Regulations," Part 17, called "Rules Governing Stations in the Utility Radio Service," sets forth the general policy and also lists specific frequency channels assigned (most of them temporarily) to this class of service.

The new Utility Radio Service will include three classes of stations having similar radio operating problems. These are power utility, transit utility, and petroleum pipe line. Power utility stations will be assigned to individuals or organizations who are producing or distributing water, gas, steam or electricity.

Power utilities which are now licensees of "Special Emergency Stations" may request a change of classification of their stations to the new Utility Radio Service. This is accomplished by a notarized letter to FCC stating:

1. Names of the licensee of the Special Emergency Station.
2. File number of each valid station license.
3. Call letters of present Special Emergency Stations.
4. Frequency or frequencies desired.

Upon obtaining reclassification, a utility may temporarily continue to operate its Special Emergency Stations on their presently assigned frequencies. Thus, scope of service may be broadened without immediate change in equipment.

Those who apply for such reclassification may be assigned frequencies as follows for the operation of Utility Radio Service:

31,460	33,820*	2726 ‡
39,660	35,140*	3190 †
39,860	37,180*	2292 †‡
31,740*	37,820*	4637.5†‡**
33,060*	39,340*	

*mobile only, **daytime only, †A-1 emission, ‡A-3 emission

New systems as well as present Special Emergency Stations reclassified under the Utility Radio Service, may be assigned frequencies from one or more of the following channels on a temporary basis:

30,860	75,420	153,050
31,980	75,460	153,230
33,020	75,500	153,410
33,580	75,580	153,590
39,980	75,620	156,810
	75,660	157,110

These latter frequencies, and a few of the former, will probably be permanently assigned. New systems operating within 20-mile radius (approx.) must utilize either the 72-76 Mc. or the 152-162 Mc. bands. The 30-40 Mc. band will be reserved for services covering more than one municipality or metropolitan area.

Procedures have been drastically simplified. A construction permit application, for example, is now a single page of 15 questions. The land station log will no longer be required to show detailed entries for each communication. Unlicensed employees of a station licensee will be permitted to operate portable and mobile stations above 25 Mc.

Foreseeing an end to its useful life, RTPB is at work on the establishment of a group which will continue to function in the utility field. Present plans are aimed at the formation, in January, of a Utility Coordinating Committee. This would consist of national and local groups. The committee would act as sponsor, coordinator, information center and FCC liaison unit for both existing and prospective radio licensees falling within the FCC's utility classification.

Finding Your Way In Electronic Circuits

Last month John Fiske introduced the subject of electronic maintenance with emphasis on equipment selection and preventive maintenance plans, then discussed the principal instruments. This article describes means of simplifying the job of locating trouble in a complex electronic unit

John Fiske

Westinghouse, Los Angeles

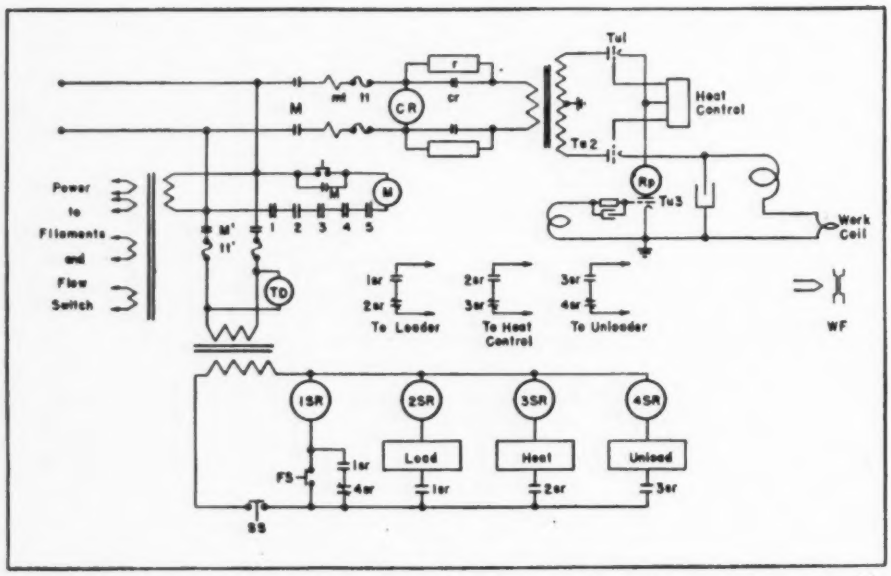
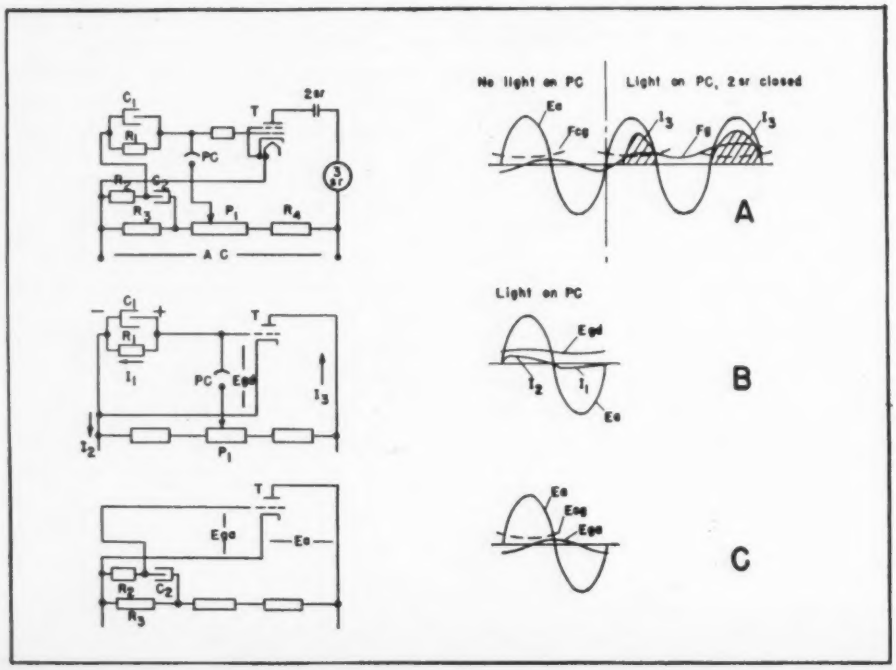


Fig. 1—Typical circuit, used as example of procedures for localizing trouble

Fig. 4—Ea, anode voltage of thyratron T; Ecg, critical voltage of thyratron T; Eg, grid voltage; Egd, d-c component of Eg; Ega, a-c component of Eg; Current 1, leakage through R1; Current 2, leakage through PC; 3, leakage through T



IN the design of electronic equipment, relays and tubes are considered as expendable items and thus are the first to be checked when trouble comes. The simplest and most effective method of trouble shooting is substitution of the suspected unit with one known to be good. Unfortunately, automatic electronic sequencing of industrial equipment results in circuits containing so many parts that substitution at random becomes impractical. The problem then becomes one of first localizing the trouble and then substituting.

Troubles in involved circuits can be localized quickly with the aid of a sequence diagram. For purposes of a simple illustration let us use Fig. 1. To develop a sequence diagram from this figure a list of breakers and relays is made in the order in which they operate and placed in a vertical column with the first at the top, as shown at the left of Fig. 2. The period during which they are energized is indicated by the heavy horizontal lines. Let us suppose the equipment loads but fails to heat the work. The maintenance man, by a glance at Fig. 2, sees that relay 2SR will give him a clue to which circuit to check. If 2SR is energized the trouble is in 2SR contacts or the heat control circuit. If it is not, then 2SR contacts or the load circuit should be checked. Sequence diagrams may be constructed in many forms. Fig. 3 is an example. Like Fig. 2, it is a sequence diagram for the circuit shown in Fig. 1, but it gives more information.

Similar diagrams may be made to indicate the sequence of operation of the tubes, or to show how the voltage, current, pressure, or other function, varies in different circuits during the period of operation.

When replacement is either not practical or produces no results, the circuit must be checked from point to point. In control circuits, this is best done by investigating the voltage between the cathode and the grid of the

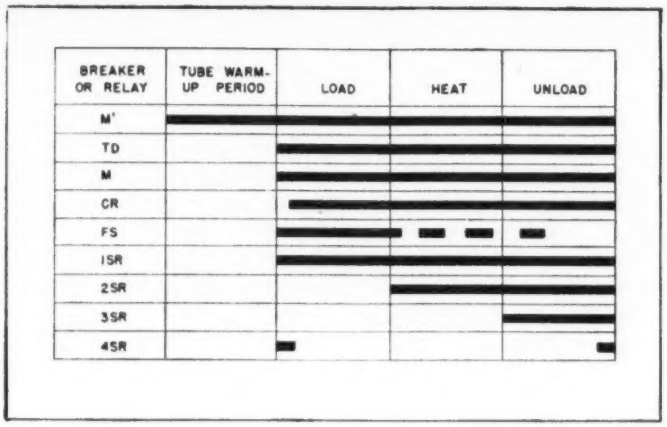


Fig. 2

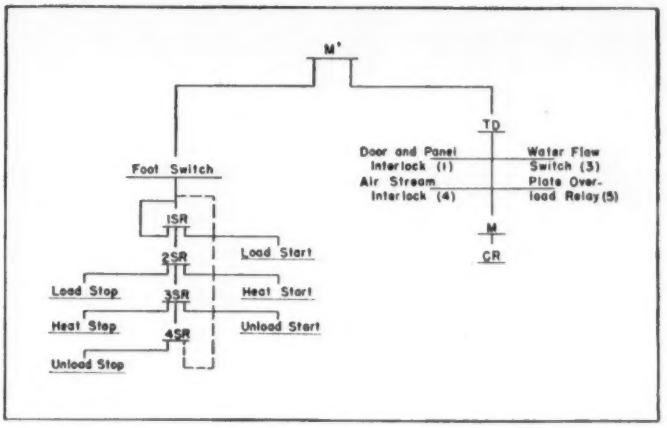


Fig. 3

control tubes. Let us assume that the diagram in Fig. 4 (A) represents the block labeled "heat" in Fig. 1. The heat time is started when 2SR closes and continues until the light given off by the metal in the work coil is great enough to energize the photocell circuit and close relay 3SR. This ends the heat time. From Fig. 4 (A) it is seen that the voltage impressed between the grid of tube T and its cathode is the sum of the voltages across R1 and R2. The circuit should now be simplified so that one voltage at a time may be investigated as in Fig. 4(B) and (C). This shows that when photocell PC is energized by the light from the work, current I_2 passes in such a direction that it charges condenser C1 positive on its grid side. This allows the tube T to fire. Condenser C1 discharges through R1 when there is voltage on C1 but the discharge current I_1 is much less than the charging current I_2 when the photocell is energized. The other bias on the grid of tube T is supplied by the phase shift circuit of R2 and C2. The voltage relationships for no-light condition and for light condition are shown in Fig. 4(A).

The ability to pick out the voltage and current values in a control circuit as shown above is necessary for only a small part of the usual shop difficulties. Most of them can be overcome by replacement of tubes or by repair of contacts and any mechanical devices subject to wear, such as potentiometers and door interlocks.

Engineering College Notes

Oregon State

New staff members of the electrical engineering department of Oregon State College are Dr. Melvin K. Kofoid, former research engineer at the Westinghouse research laboratory at Pittsburgh, Pa., and Dr. Philip C. Magnuson, formerly with the General Electric Co. at Schenectady, N. Y.

U. of Colorado

To accommodate a fall-quarter enrollment exactly double that of prewar days, the College of Engineering, University of Colorado, has added more than 35 new members to its faculty. Included are:

Prof. Harold W. Sibert, to assist Prof. K. D. Wood, head of the newly organized aeronautical engineering department. Sibert served in the Army Air Corps as a lieutenant colonel, advising on aerodynamics; before the war he taught aeronautics at U. of Cincinnati. Also added to the aeronautical staff: Capt. Allen R. Deschere, from Army Ordnance.

Prof. Byron E. Lauer joined the chemical engineering department staff. He had served in Chemical Warfare service as a lieutenant colonel.

The electrical department added five young men with valuable experience in the armed services and industry. They are Willis Worcester, Harris Thompson, John Twombly, William Hanna, and Marion Smith.

There are four new instructors in engineering English.

UCLA

Signs of the times may be read into courses recently approved for the Department of Engineering, University of California, Los Angeles. Among them are the following:

Human Dynamics — Physiological and psychological reactions of man induced by his interactions with machines, processes, structures and circuits. Man's response to the electrical, thermal, and mechanical force fields and man as a source of work will be stressed.

The Engineer and His Professional Duties (for seniors)—Various subdivisions of knowledge with emphasis on the socio-humanistic periphery of engineering. Class meetings will be devoted to the subjects of the history of technology, business organization, personal efficiency, professional codes and ethics, industrial procedures, and engineering report writing.

The Anatomy of Engineering (for entering students)—The philosophical basis of engineering and the present scope of the profession. Biographies of eminent engineers and the organization of engineering in industry.

Sales Engineering (for seniors)—Principles of engineering sales illustrated by the case method. Selection and assembly of prefabricated components in the solution of a production and construction problem. Presentation of the service function as it is related to sales engineering.

Atom Power Lab

Hanford Engineer Works, the plutonium plant in Washington state, where General Electric Co. is at work on the problem of developing useful power from atomic energy, will have access to a $20,000,000 nuclear energy laboratory near Schenectady, N. Y., also to be operated by G-E under a contract with the Manhattan Project.

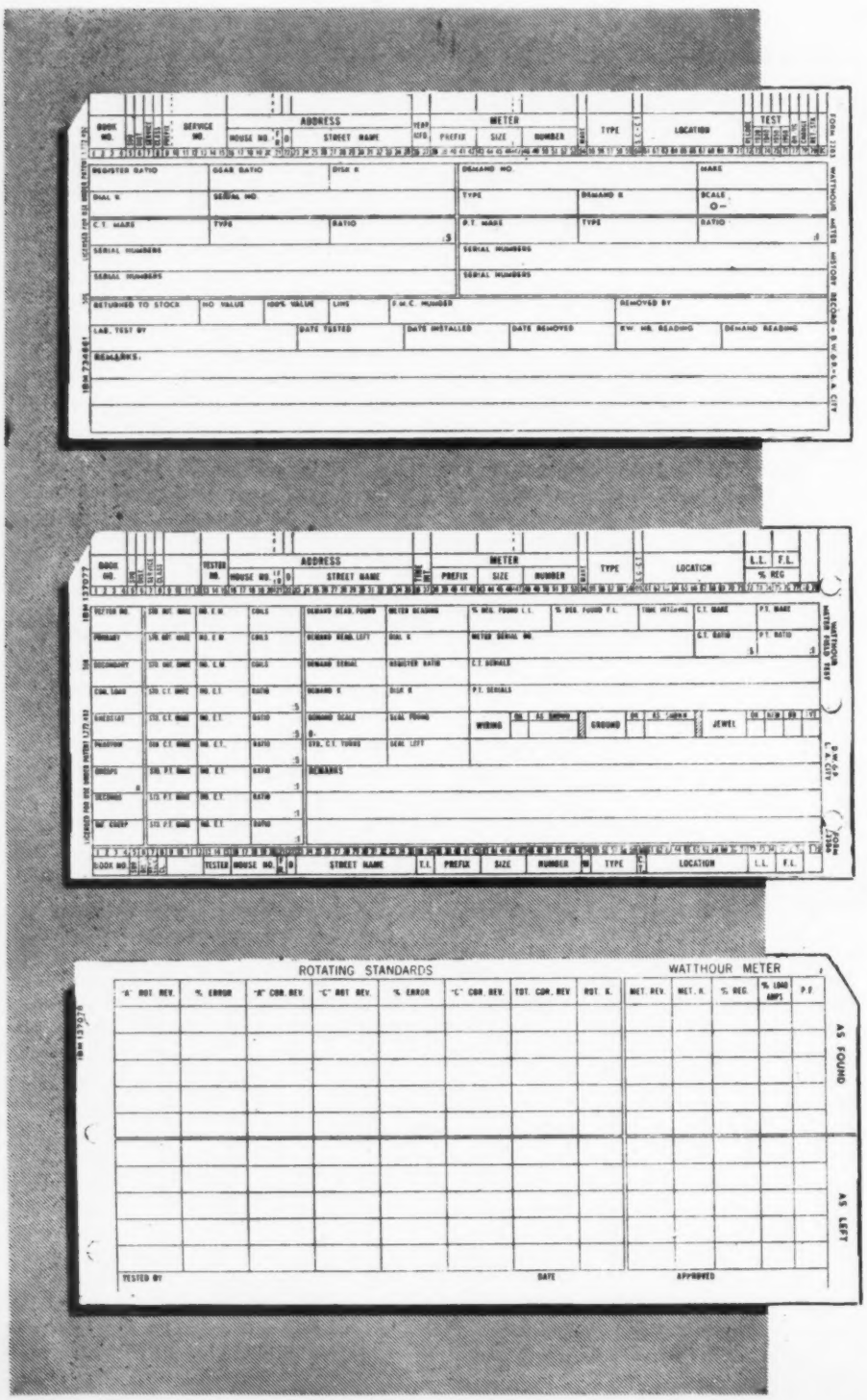
Research connected with power generation by atomic energy will be the principal effort at the new laboratory, according to the War Department. To be known as the Knolls Atomic Power Laboratory, it will be the fourth established by Manhattan Project to further nuclear research. It will be transferred to the atomic energy commission as part of the peacetime program.

Other laboratories are: Clinton Laboratory, Oak Ridge, Tenn.; Argonne National Laboratory, Chicago; Brookhaven National Laboratory, Long Island (under construction).

Keeping Meter Records With Business Machines

H. W. Bruce

Supervisor, Laboratory Meter Tests and Records
Los Angeles Department of Water & Power



THE Testing Laboratories of the Los Angeles Department of Water & Power are using the International Business Machine tabulating card system for keeping a record of all watt-hour meters on the system. The IBM system was chosen because it was being used in other divisions of the department.

Fig. 1 shows a meter history card. This is an 80-column card, and information punched in these columns can be reproduced by machine automatically. The cards show the class of service on which the meter is installed, and from these cards data can be furnished to the department rate engineers for the purpose of rate studies and reports. Field test orders are also made by machine from these cards. A manila card is used for self-contained meters and a salmon colored card for meters with instrument transformers.

For testing purposes the department's electric system is divided into 15 districts, with approximately 42,000 meters in each district. Three of these districts are in the outlying and 12 are in the inlying areas of the city.

Large-capacity meters are tested on a one- to three-year schedule. Testers

Fig. 1

are working in the outlying districts all through the year. In the inlying districts the routine testers work in, and complete a district each month. With the exception of installation and complaint tests, no testing is done in that district for another year.

The following outlines the procedure for one- to three-year meters.

A meter history card, Fig. 1, is used as a routine card and filed in a routine file to show the meters due for test in each district each year. This card carries the district number, address, meter number, make, type, and location.

Fig. 2

Field test orders are duplicated from these routine cards, using an alphabetical key punch machine, at the rate of approximately 350 per hour. Without the machine approximately 350 field orders were written and checked in eight hours.

The field test card for one- to three-year meters is shown in Figs. 2 and 3.

The procedure for preparing field test orders for small-capacity meters:

The history cards, Fig. 1, are run through a sorter which will handle approximately 24,000 cards per hour.

Fig. 3

By means of the sorter, cards for a desired district are removed from the file. The removed cards are again run through the sorter and cards for meters recently installed or tested on complaint are removed. The history

cards for meters due for test are then run through a reproducing punch machine which duplicates the card. See Fig. 4. This machine will reproduce

Fig. 4

approximately 6,000 cards per hour. The cards are then run through an interpreter which prints the data indicated by the punchings on the card. This machine can interpret approximately 3,000 cards per hour. The field orders are then sorted to reading book numbers and are ready for the field tester.

Forty thousand field test orders can be prepared in approximately 72 machine hours. One tabulating equipment operator can operate more than one machine so the actual man-hours are less than the machine-hours. The sys-

Fig. 5

tem previously used would have required approximately 500 man-hours to prepare the same number of small-capacity field test orders.

The field test orders are punched when returned from the field to show the "as found accuracy." This makes it possible to sort and count the tests by machine for the purpose of an accuracy report. Meter tests are filed by meter numbers.

The IBM collator can be used for the merging of two files that are in meter number order and can be used to remove any group of desired cards

Fig. 6

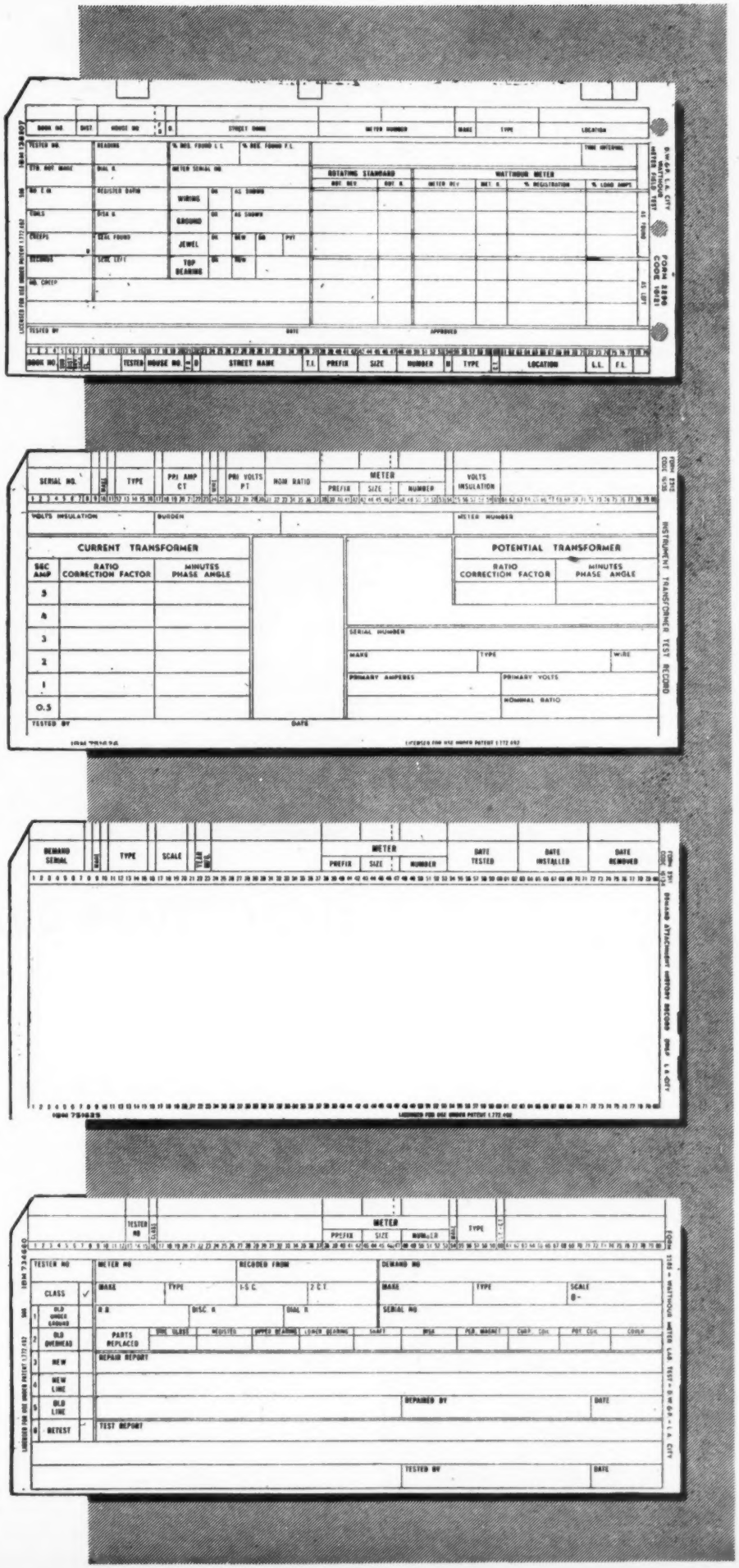
from the file. For example, suppose it is desired to know the number and location by addresses of those 5-amp., 120-volt, 2-wire single-phase, type H meters manufactured by the Sangamo Electric Co. which are installed on domestic lighting services and located on rear porches. The cards for these meters can be removed without disturbing the sequence of the main file and, after counting and tabulating to obtain the desired data, they can be merged by machine back into the file. The collator will handle approximately 18,000 cards per hour.

Fig. 5 shows a card used for keeping test records and data on instrument transformers. The arrangement

Fig. 7

for maintaining maximum-demand attachment records is shown in Fig. 6. Tests made on meters in the laboratory are recorded on another form, one side of which is shown in Fig. 7.

Sufficient experience with the system has not yet accumulated to enable comparison of the cost of keeping the new history file with that of the old manual system. The new system, however, supplies more data and provides a practical way of finding and tabulating these data.



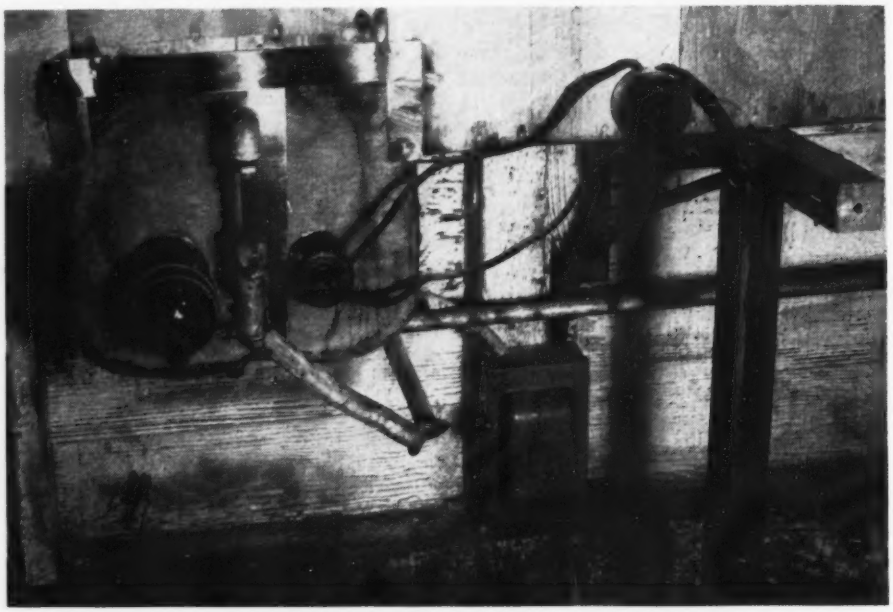
The Electropult

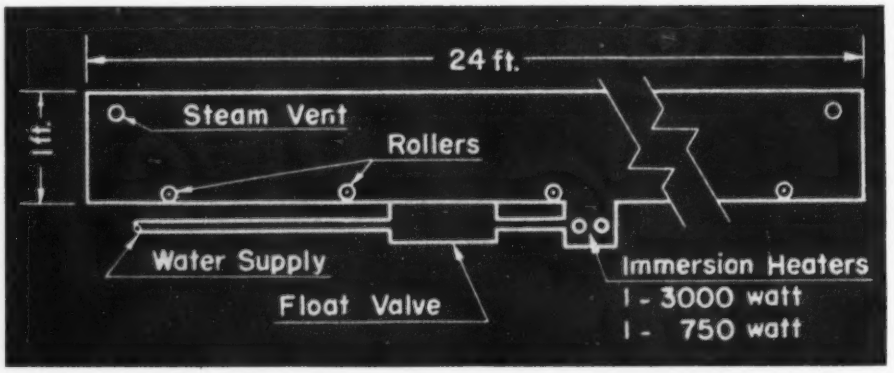
Something new in electric motors is the Electropult, built for the Navy by Westinghouse for launching aircraft. It is a 15,000-hp. squirrel cage induction motor with its "rotor," or secondary, laid out in a quarter-mile long straight line, and its "stator," or primary, used as the moving part. The secondary is built below the surface of an airplane runway, and the primary is a sort of car which straddles the secondary and pulls the planes down the strip. The car is 12 ft. long, 3½ ft. wide. It rises 5½ in. above the runway.

The Electropult has launched the largest airliners in use today at 120 m.p.h. flying speed in a run of 500 ft., as compared with 4,000 ft. required when the plane is unassisted. Maximum acceleration for this performance is 1G during the first 2 sec. of run.

Power to supply the Electropult's brief but heavy demand is stored up in a 24-ton flywheel. The flywheel is got up to 1,300 r.p.m. by means of a d-c motor of about 1,000 hp. The motor gets its power from a 750-kw. generator which is in turn driven by an aircraft type gasoline engine. Then, when the Electropult is operated, its power is extracted through an a-c generator, designed to furnish the required 7,000 amp. Resistance of the first 1,000 ft. of the Electropult secondary is progressively decreased in four steps to maintain constant tractive effort. The remaining 382 ft. is used for decelerating the car, both by dynamic braking and by application of d-c.

Originally designed for launching naval planes from small Pacific islands (although not actually so used), the Electropult has many possible applications to peacetime aviation.





Electric Steam Box for Boat Builders

Mark M. Clayton
Industrial Engineer, Bonneville Power Administration

Electricity is being successfully used by builders of salmon fishing boats along the Columbia River to generate steam for bending wood and other materials used in boat building. The steam is usually generated in electric steam boxes, which the boat builders have constructed for themselves. Total cost is usually less than $100.

L. M. Ronning, Cathlamet, Wash., made such an installation a year ago and reports that faster, more reliable performance has resulted. Normally, boat builders use a wood-burning steam boiler and the conventional steam box for preparing wood members which are to be bent to shape.

Ronning's installation is shown in the photo and sketch. The box, 24 ft. long, 16 in. wide, and 12 in. high, has a small water reservoir fitted to the bottom cente.. The heating elements, consisting of one 3,000-watt and one 750-watt immersion type units, are mounted within this reservoir. Water level in the reservoir is maintained by means of an adjacent float valve. These parts are constructed of 16-gage sheet metal covered with 1-in. Firtex.

By arranging the system so that the reservoir contains only a small quantity of water, steam can be generated very quickly. Steam which condenses on the inside of the box is returned to the reservoir by gravity.

Ronning found that the steam box could also be used to condition Plexiglas plastic. This is used in Ronning boats for curved cabin windows, which improve the degree of unobstructed view, as compared with plane windows.

Small boat builders do not need to operate such equipment continuously. Ronning has found that the electric box, after a year's use, increased his power bill by only $3.75 per month.

Lighting Looks to its Future Promise

Three IES Regional Conferences in Seattle, San Francisco and Los Angeles bring the Quebec convention West in tabloid form, with added local touch

An echo sometimes bounces several times in the walls of a canyon. Similarly, the Illuminating Engineering Society's annual convention at Quebec in September reverberated three times in a series of bouncing regional conferences in Seattle, Nov. 14-15, San Francisco Nov. 18, and Los Angeles, Nov. 22. Each was a concentrated tabloid version of the main convention, and that in Seattle was practically an international convention itself. British Columbia Chapter, newest of the IES, sent 60 delegates from Vancouver, Victoria and New Westminster.

Because, through coordination of the programs at the three conferences, the featured speakers were the same in each case and the ground covered similar, separate reports of these condensations of convention papers will be run in the following pages. Because Seattle gave two days to the conference whereas San Francisco and Los Angeles confined theirs to one concise day, that chapter was able to have a panel discussion following each paper and also to include one or two extra addresses. The panel discussion was especially valuable because it brought forth other viewpoints and sometimes questions raised by the convention paper, which the speaker was able to answer.

IES President Gilbert K. Hardacre, commercial and lighting manager, Public Service Co. of Northern Illinois, was accompanied on his tour of the three conferences by two of the Quebec convention speakers, E. W. Commery, General Electric Lamp Dept., Nela Park, Cleveland, who gave a condensed version of his own paper and that of Ward Harrison and Phelps Meaker; and William F. Rooney, commercial engineer, Sylvania Electric Products Inc., Salem, who briefed his own paper and those of R. R. Wylie, *Practical Color Harmony With Fluorescent Light Sources*, and J. C. Kromhout, *Light and Form*, both of the same company.

Dr. Leland H. Brown, Stanford University, regional vice-president of IES, South Pacific Region, presented at each meeting a summary of three papers on school lighting, *Quality Lighting in Schools*, by Russell C. Putnam, Case School of Applied Science; *Integrated Lighting for Classrooms*, by R. L. Biesele Jr., Southern Methodist University; and *Classroom Fields of Vision*, by A. S. Turner Jr., General Electric Co. and A. A. Brainerd, Philadelphia Electric Co. Dr. Brown, while attending the Quebec convention, contacted the president and speakers on behalf of the three regional conferences.

Fred J. Wellhouse, Westinghouse Electric Corp., San Francisco, and former regional vice-president, presented the E. W. Beggs (of Westinghouse) paper, *New Developments in Mercury Lamps for Street Lighting*, and demonstrated the new thorium-cathode mercury lamps capable of burning in any position, and the new Westinghouse mercury lamp street lighting luminaire which completely shades the light source, a design to which Wellhouse himself contributed much. The other Westinghouse paper, that of F. C. Winkler, *Functional Store Lighting and Application*, was given in condensed form at the three conferences respectively by Gale Blanchard of the Seattle office, George Leves, San Francisco, and W. A. Alden, Los Angeles.

Besides acting as coordinator for the programs of the three conferences, William A. Cyr, ELECTRICAL WEST, presented at each a Western version of the customary "progress report," illustrating by lantern slides new lighting installations and techniques to be found in the West.

The Seattle conference had two additional Eastern speakers, as well as several local speakers. Louis J. Schrenk, general superintendent, Lighting Commission, Detroit, presented his IES convention paper, *Application Experience of Street Lighting Recommended Practices*. R. E. Madigan, airport lighting engineer, Line Material Co., Milwaukee, spoke of *Wartime Developments in Airport Lighting*, and demonstrated the Bartow Beacon.

Both the San Francisco and Los Angeles meetings were concluded by a special demonstration and explanation of the high-speed flash tube with which instantaneous photographs are made of objects in motion. This was given by F. E. Gilbert Jr., electronic division, Sylvania Electric Products Inc., Los Angeles. Another extra at the Los Angeles meeting was the demonstration by Foster K. Sampson, consulting electrical engineer, of a device to show moving pictures and slides to school classrooms without darkening the room. A translucent screen is employed.

Other specialties of the Seattle meeting included: an explanation of the standards now set up in British Columbia for school lighting by a provincial commission. Dr. Robert F. Sharp of that committee gave the details of it to the conference. Miss Rae Jackson, home lighting supervisor, B. C. Electric Co., gave a brief talk on the woman's viewpoint in residential lighting and told of her company's program to aid home lighting. Chester W. Jarrett, Portland General Electric Co., surprised the conference with a simple explanation of the homespun program his company employs to teach the people of small towns the elementary and basic principles of lighting and seeing so that they can more intelligently select lighting to suit their own needs.

Discussion groups at the Seattle conference contributed many valuable sidelights. They had been especially well chosen by the local committee. On these panels were: Interior and sales lighting—G. M. Boyd, Westinghouse; H. A. Gardner, maintenance engineer, Frederick & Nelson Department Stores; Lyman Day Morgan, Pittsburgh Reflector Co.; R. E. Decker, architect. School lighting—F. A. Naramore, architect; B. A. Travis, consulting electrical engineer; Ernest Mock, Tacoma architect; Elmer Breckner, director of school planning, Washington State. Residential lighting—Edith Rauch, home service director, Puget Sound Power & Light Co.; William Gordon, Seattle Lighting Fixture Co.: Dorothy E. Constans, home decorations consultant, Frederick & Nelson: Mrs. Virginia Farrar, color consultant; Frank Anderson, Westinghouse Lamp Div.; K. F. Sutherland, Dupont Co., paint expert. Glare—Lyman Day Morgan; Prof. Gordon Schuck; Dr. Clinton Utterback. Street and highway lighting—J. W. A. Bollong, traffic engineer, Seattle; Kenneth B. Coleman, Fred R. Boynton and C. A. Crosser. Airport lighting—Paul Marble, Civil Aeronautics Administration. In some cases, for lack of time, those interested in a special topic, such as school lighting, and street lighting, left the general meeting and continued their discussion in a separate meeting room.

Dean E. A. Loew, University of Washington, Seattle, welcomed the conference delegates to Seattle on behalf of President Raymond B. Allen, who could not reach the meeting due to flight cancellation. Walter Potter, regional vice-president, too, was prevented from appearing because of a

serious accident at his Portland home.

Organization for the Pacific Northwest International Regional Conference, as it was called, was headed by energetic C. T. Bakeman, Puget Sound Power & Light Co., and last year the regional vice-president. He had set up a general conference advisory committee of 23, representing all branches of the industry and all areas in the region. Three IES chapters participated, the British Columbia Chapter, the Washington State Chapter, and the Oregon State Chapter. Bakeman presided at the first morning session. In the absence of R. D. Kennedy, chairman of the Oregon chapter, H. S. Johnson, secretary, presided over the Thursday afternoon session. B. T. Heinz, chairman of the Washington Chapter, presided Friday morning and Walter Lind, chairman of the B. C. Chapter, the final session. Meetings were held at the Edmund Meany Hotel, in the university district. Total registration exceeded 250.

Dr. George W. Allison, and K. E. Hollingsworth were the conference secretaries and E. C. Branch, also of Puget Sound Power & Light, was program and papers chairman. Frank T. Anderson, Westinghouse Lamp Div., was finance chairman; Charles Dickenson, Sylvania Electric Products Inc., chairman of entertainment and local arrangements; William Creech, Graybar, of attendance and registration; Edith Rauch of ladies receiving and Ted Birchard, publisher, of publicity.

Northern California Section was host to the San Francisco meeting held in PG and E auditorium, and its chairman, E. J. Willits, Tidewater Associated Oil Co., presided. M. G. Lewis of Austin Wilmott Earl Co., vice-chairman, was conference committee chairman; Robert Thallon, Pacific Gas and Electric Co., secretary of the section, had charge of registration; D. G. Parker, General Electric Supply Corp., of attendance; Fred J. Wellhouse, of the president's dinner; G. A. Trosper, PG and E, of the auditorium and properties. W. A. Cyr was program coordinator. Total registration, including guests, was about 175.

Southern California Section, host for the Los Angeles conference, selected past vice-president and originator of regional conferences, Frank A. Hansen, Western Institute of Light & Vision, as conference chairman. Section chairman L. W. Luley, Westinghouse Electric Corp., opened the meeting and T. H. Shepherd, Department of Water & Power, Los Angeles, presided over the first session; George M. Rankin, Southern California Edison Co., and immediate past vice-president for the region, over the afternoon session. Leonard Towner, General Electric Co., secretary of the section, also had charge of publicity; Roy E. Dahlin, Edison Co., of arrangements for the president's dinner; T. A. Esling, same company, the auditorium and properties, Jesse W. Hicks, Sylvania, of entertainment; Oscar W. Meissner, Department of Water & Power, of attendance; R. G. Knopp, Phoenix Glass Co., of registration. Registration at the Los Angeles meeting, held at the Southern California Edison Co. auditorium, was 300, many groups interested in one phase of the program coming in relays.

Following are summaries of school, street and airport lighting subjects; next month will come store and home lighting papers and discussions.

President Hardacre

WHAT the Illuminating Engineering Society is, of whom it is composed, what its aims are, and how it operates was told each of the conferences, and the San Francisco Electric Club by Gilbert A. Hardacre, IES president.

Membership in the society is all-inclusive, including engineers, scientists, researchers, architects, contractors, paint and glassware people, optometrists and eye specialists. Its field embraces all light, either natural or artificial, and even into the invisible. The one who asks selfishly, "What can I get out of it?" fails to appreciate properly what the IES has contributed to the general advancement of illumination in all fields during the past forty years of its existence.

The society operates on three levels of activity. The first is that of research in lighting, where the scientists develop basic knowledge on seeing and light. This is presented in papers at the national conventions. Much of this knowledge is new, often untried and untested, but it is a most important level from the standpoint of the future of illumination. Some times this level of activity is several years ahead of the field. It is the spearhead of progress for all lighting.

The IES has established a research trust fund which now has in it some $50,000 for pure research. Three grants for projects have been given recently: one is for studying the control and direction of daylight. The second is a study on eye muscular fatigue. The third is a check for verification of various formulas in tables in use by the illuminating engineer.

The second level or function of the society is that in which this new basic knowledge is put into more usable form. Tables and data are made available to members by 35 technical committes. Recommended practices are developed in various fields. Much of the information is field tested before it is put into practical use. Hardacre mentioned the committee on lighting in the canning industry which is centered in California. He told how the National Canners Assn. is associated in the project for field testing and has furnished an $1,800 fellowship to Stanford University to carry on this research.

The new IES handbook comes in this field. It is hoped to have it ready for publication by the first of the year. It will combine in one volume all of the data which are now scattered through many reports and booklets of various kinds. Operating on a democratic principle, with the number of people that this project involves, it has taken some time to be consummated.

The third level, Hardacre said, is composed of people who have a day-to-day contact with the public. He said that he himself is in this category. At this level the regional meetings are held, sections and chapters have their meetings, the study clubs operate. This group, he said, was the most important to the public.

Hardacre declared the membership of the society today is 5,000, but urged that more sustaining memberships be obtained. A balance must be maintained between the active members and sustaining members in order to carry on the basic work of the society in the research field. The dues from members are utilized in the services that they receive, and in preparing the publications made available to them.

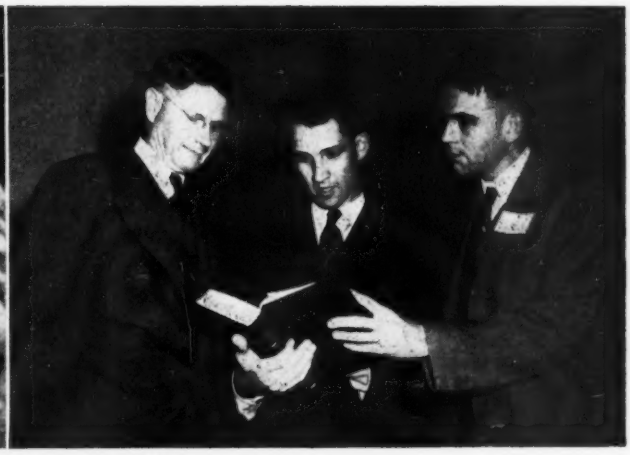
He was complimentary to the three regional conferences, and declared that this may be the forerunner of a new development in the society. This was the first time that authors of papers at the national convention had brought them to regional conferences, and had been on a program combined with local features and authors. This helped to strengthen the society by encouraging more participation at the field level, and it might be possible to sectionalize the society in the future.

School Lighting

THREE papers dealing with school lighting were reviewed by Dr. Leland Brown.

First was a paper, *Classroom Field of Vision*, written by A. S. Turner Jr. and, A. A. Brainard, in which two different schools were used as an experiment. They found out that a change of viewpoint has taken place since 1928 when the last recommended practices for school lighting were developed. Many architects are studying the use of daylight to utilize it efficiently. The new light sources make possible design with lower brightnesses

George Rankin receives Fellow scroll from Hardacre



E. J. Willits, Mel G. Lewis and Dr. Leland H. Brown

to work with and there is greater stress on quality of lighting instead of quantity.

From the test schools they found that even modern buildings with large window area do not permit uniform light distribution by natural light, and that light-colored surfaces are an important factor in equalizing brightness. With a combination of natural and artificial lighting the brightness ratio can be better controlled. Strong emphasis was made in this paper of the value of cleaning and maintaining fixtures. Illumination values jumped 50% after fixtures had been cleaned.

A second paper, *Creative Lighting for Classrooms*, by R. L. Biesel, likewise touched upon brightness ratios and pointed out that the ideal for visual environment set up by the IES is to be found in the quantity and quality studies of the committee on that subject. Likewise related are psychological studies by Dr. Harmon of Texas, which say that attention will wander to surrounding areas of greater brightness. Likewise Dr. Harmon stresses the need for enough directional lighting to give a third dimensional modeling, important in childhood development.

As in the previous paper, actual field tests and lighting studies were reported on from schools in Dallas, Tex., where rearranging of the desks, shielding of the windows by means of muslin screens, and redecoration were used to bring the relative brightnesses all within range.

The third paper, *Quality Lighting in Schools*, by Russell D. Putnam, Case School of Applied Science, Dr. Brown said, was written more from an engineer's viewpoint. He also stressed the interest the engineer must take in brightness control which involves not only the light source or luminaire, but the method of installation, finishes, visual field, and the utilization of natural light. He recommended translation of the general principles into some sort of working basis, and set up his own recommendation that ceiling brightnesses should be about 80% reflection factor, walls and tack boards, 50-65%, wood trim 35%, desk tops, 35%, floors, 30%, and chalk boards up to 20% to be acceptable.

Outlining the standards established by British Columbia for its schools, Dr. Robert F. Sharpe told of the work of a committee appointed in 1944, which had published its report January 1945. Now in order to get government grants for assistance in school building the schools must meet the standards set forth.

Dr. Sharpe reported that the minimums were raised from the 1938 school recommended practices of IES in each category, and that likewise maintenance standards were set up. The standards recommend more attention to orientation of the building to make use of natural lighting. They likewise recommend indirect incandescent lighting and the bowl reflector lamp for efficiency and ease of maintenance. At the time the standards were written, he said, suitable fluorescent fixtures had not been developed and weren't recommended. Provision for future blackboard lighting was also made. Reference was made, too, to possible use of photoelectric control and germicidal lamps.

In the school discussion session, many other factors were brought out also. F. A. Naramore, architect, spoke particularly about the practical side of lighting with reference to cleaning and maintenance, and the cost of the lighting system both initially and for operating purposes. He likewise spoke of the competition between the various industries to get their best equipment into the schools. He thought that the IES should recommend the type of fixtures to be used. Speaking of light-colored blackboards, he said that they had been used in some cases and discontinued because of the dark chalk required. Particularly he spoke of experience with a sanded glass chalk panel. After some time the chalk and erasing had worn the surface smooth and polished the glass so that it reduced its usefulness as well as causing bright reflections. In the matter of deflectors on the windows to diffuse the light, again the maintenance problem was paramount, he said. With monitor or skylights or cross lighting, there was the problem of screening these windows to control the excess sunlight at certain hours of the day.

Dr. Brown said that experience had shown that venetian blinds were the most satisfactory method of controlling daylight at windows, but again this required maintenance.

B. A. Travis, electrical engineer, commented on the high standards set for factory illumination by the Department of Labor in the state of Washington, yet there was no such standard for the schools.

Ernest Mock, architect of Tacoma, asked what material was used for light-colored desk tops, and Dr. Brown explained that the desks were sanded down and lacquered, and then the surface gloss rubbed off. The problem of getting light lumbers at the present time made light desk tops difficult to obtain.

Elmer Breckner of the Division of School Planning for Washington State, spoke of the need for more education of the public since the final authority to the building of each school is the local board. Maior counselors for these boards are local architects connected with school plant planning, and he recommended that it was up to the experts to establish relationships with these people so that they can give them the information necessary for proper school lighting. He also stressed the need to incorporate courses of instruction for those who enter the field of school administration to give them something regarding illumination, so that they will recognize its importance and will be looking for the answers and call for assistance from the properly qualified professional illuminating engineers.

Street Lighting

TO BEGIN the street and highway lighting program, Louis J. Schrenk general superintendent, Detroit Lighting Commission, presented his paper regarding the experience of Detroit in using the street lighting recommended practices of IES. "If you have light, you have life. If you have darkness, you have death," Schrenk declared, and said that he meant it literally. Detroit has had considerable experience with lighting of various intensities. Its program of rigid enforcement, improved roads, better automobiles, and all the usual safety measures had had no effect on the accident rate at night. It was admitted that defective vision contributed somewhat to daytime accidents, and trees, parked cars, buildings, curves, etc., were accepted as obstructions, and a program of removal carried on. From this, however, it was realized that lighting was also needed as the removal of an obstacle to vision.

Schrenk stressed the importance of seeing when moving about, and said that the more one moved the more important seeing becomes. With high-speed automobiles, seeing becomes imperative. Safety is entirely dependent on the drivers' and pedestrians' ability to see.

The first installation of safety lighting was placed on 31 miles of street in the sections where the highest death rate had occurred at night. After the improved lighting installation the death rate in these areas was reduced to about the same as that in daytime. Now Detroit has over 350 miles of streets that are adequately lighted, and the commission feels that 100 lives are saved annually as compared to pre-lighting levels.

The city has become extremely street lighting conscious because of the publicity gained, and the public is the monitor. When lights go out they notify the commission.

From an engineering standpoint, the system is operated right up to the specified voltage of each lamp, and a strong maintenance program is conducted. Every unit is serviced three to four times a year. "When you spend a lot of money to put up poles, units, etc., the only way to get your money's worth is to see that the equipment is delivering all that it is worth," said Schrenk.

Schrenk also said that it was not necessary to bring illumination levels up to those necessary for seeing-by-surface-details, since a great deal of street seeing is done by silhouette. He advocated the new type of luminaire which places the light on the street and prevents it from being wasted in the air. Thus with the same wattage Detroit's experience has been that it can get much more illumination on the street.

He told of the city's experimentation with various light sources. The fluorescent lamp had been tried in a system of 50 troughs along the street, but the maintenance cost to service them was too high because of the greater time needed to clean each. Fluorescent lamps were also more sensitive to winter temperatures, during which only 20% of the light-up was obtained. This was so even though the fluorescent lamps were installed in flasks.

Sodium lighting had not met with the approval of the public because of its depressive color, but its distinct yellow was good to mark danger spots.

Mercury lighting had been tried in a residential area where a through traffic artery passed, and met general favor because it accentuated the green foliage. It was efficient, Schrenk said, and its long life made it an economical light source.

In the business districts the pendant type of unit, now made by General Electric, had been designed by Detroit, and was so successful that that company had decided to make it. Likewise, the control of the light was good enough so that there was no request for shading of lamps by customers anymore.

The lighting usually complies with the IES standards. Units are mounted 25 feet high 300-350 feet apart, using 6,000 lumen lamps, 16 to 18 lights per mile in the residential sections, with closer spacing in business districts. All standards are being replaced to get higher mountings, of the pendant type, in an attempt to get from 8/10 to one lumen on the streets in a flat distribution curve. Schrenk felt that nothing less than 8/10 of a lumen would give traffic safety. He likewise showed illustrations of tree trimming where the lower branches are removed to give clearance for the lights and still contribute to the beauty of the streets.

J. W. A. Boolong, traffic engineer for the city of Seattle, responded. He paid tribute to the mayor of Seattle for his support of a program for the relighting of Seattle streets, and told of traffic studies being made to determine where the relighting would be done.

He mentioned various other factors the traffic engineer has to take into account, including the visibility, the traffic, the density, the type of streets, the street surface, and especially its specularity, the types of buildings, the mass transportation, the parking, trees, and the record of accidents. He likewise cited the necessity to provide better illumination of streets and alleys for crime prevention. As laymen become more familiar with the traffic problem, he concluded, they will demand from their city fathers the relighting of streets.

In Small Towns

HOW the small town can be made acutely conscious of street lighting was told very amusingly by Chester W. Jarrett, Portland General Electric Co., at the Seattle meeting. Forced to neglect street lighting in small towns during the war, his company, he said, found it necessary to develop some type of program and approach for small cities. "Why, some of our towns have as many as five intersections," said Jarrett.

It was learned that the average man doesn't know the technical terms. To him "6,000 lumens is six gallons of milk. He knows what 300 watts will do in a house, but beyond that not very much. However, the plumber in town is an expert and one often sees such monstrosities as an arch over the main street containing 25-watt lamps and useful for hanging buntings on special occasions.

Home lighting panel, E. W. Commery, speaking; Mrs. Farrar, Sutherland, Heinz, Anderson and Gordon

Dr. Brown and school panel, Dr. Sharp, Breckner, Naramore, Mock, Travis, Branch and C. T. Bakeman

The technique used was to call meetings of the local people, and to make "junior illuminating engineers" out of everyone who attended. They are given, in understandable language, with the use of illustrations and samples, an idea of the principles of illumination, and then invited to the street lighting laboratories which the company has in Portland and where fifty luminaires have been set up so that the public can see them.

The public has been greatly interested in the full process, and takes great pride in the project. Where people are properly educated and understand what it was all about, they demand good lighting for their own community. "Remember we didn't tell them what to put up, they decided these things for themselves," concluded Jarrett.

Airport Light

ANOTHER Seattle exclusive program feature was a talk by R. E. Madigan, airport lighting engineer of Line Material Co., *Wartime Developments in Airport Lighting.*

War was the laboratory for the lighting of airports, he said. Before the war the Civil Aeronautics Administration had done some work, but when the war came along the Army and Navy took over. Now the CAA is starting over again.

Because of the high speed of modern aircraft it is highly necessary that the pilot get information instantly. At the speed at which he is traveling, he has only the fraction of a second in which to make a decision and line himself up with the center of the airstrip. Each airport needs a permanent system of the style that will work either in the Aleutian Islands in bad weather, or on the desert.

With civilian air development after the war, permanent installations will be needed, and the problem will be to provide safe flying in all weather. Several crashes during the past few months have re-emphasized this necessity. The air lines are now a big industry and cancellation costs run high.

Radio approaches to the airport are important. But such systems are still in the stage of development. They have to be supplemented by visual signals always.

Within a split-second's timing the pilot needs to know his altitude, his attitude or position relative to the runway and to be able to judge the distance. Direction and speed are given him by timing of equally spaced objects. In the daytime he can see these objects, but at night such even spacing by means of lights gives him his relationship of speed to the ground.

Madigan predicted that the approach systems to airports would be developed for ten miles on each side of each airport, using color codes to convey certain information to pilots. Colored light is not a penetrant of fogs since no color is better in fog than others.

The factors necessary are maximum light signal, high-candle-power light output, no glare in the eyes of the pilot, variable intensity, variable focus, and color adaptation.

Paul Marble of Civil Aeronautics Administration concluded by saying that standards are being developed for airports all over the country, and that from 300 to 400 fields are to be built in the near future, most of them requiring lighting of the landing strip.

Mercury Lamps

A visual demonstration of the *New Developments in Mercury Lamps for Street Lighting* was given along with the paper of E. W. Beggs, Westinghouse Electric Corp., by Fred J. Wellhouse, street lighting engineer for the same company, San Francisco, in all three meetings.

Wellhouse first gave the essentials of Beggs' paper in describing the improvements in mercury lamps, and then spoke specifically of their probable application in street lighting.

The principle improvement in mercury lamps has been the concentration of the light source into a smaller space, almost a point source, and in developing lights of large lumen output, likewise the ability to burn these lamps in any position. Earlier mercury lamps could be burned only in a vertical position. To derive a greater co-efficient of utilization it is necessary to confine the light source to a point if possible since most of the means of controlling light are based on a reflector or refractor of which the light source is the focus.

High concentration can be achieved by using a quartz tube. The first mercury lamp was a 250-watt, which gave 40 lumens per watt. Next came the 400-watt with 50 lumens per watt. The new 1,000-watt mercury lamp gives 60 lumens per watt because it can operate at higher pressure and therefore at higher efficiency. The ceiling of the incandescent lamp is around 20 lumens per watt.

Longer life is given these lamps now because of the use of thorium instead of barium oxide for the cathode. With a chromium metal cathode these lamps have unlimited life, and the time of replacement must be determined by their point of depreciation of light output. Thus, group replacement on a regular schedule, based on foot-candle measurements or on a certain burning life, is to be recommended.

The most important application which can be foreseen for these mercury lamps is in street lighting. In the past, only the large size, burned vertically, could be used, necessitating the placing of the lamp within view of the motorist as he went along. With the new 20,000-lumen lamps placed horizontally, a 50 to 60% utilization can be achieved by the new design of street lighting unit, and from 10,000 to 12,000 lumens of useful light can be distributed on the street with the same wattage. This is two and a half times the previous illumination.

With this combination the lowest over-all cost for all types of lighting is obtained when all factors are taken into account.

The new unit provides more shielding of the street lights, especially for traffic arteries, reduces glare, and gives better visibility, so that the motorist can see more on the street. These new units have a shallow basin-like appearance and can be blended nicely into the street lighting luminaire design.

Rooney, left, and store lighting panel, Blanchard, Decker, Gardner, Morgan (hidden) Boyd and Branch

Street lighting unit and panel, seated, Jarrett, Boolong and Schrenk, Wellhouse, not shown, spoke

Western Lighting Progress Report-1

Market Basket is in Monrovia, Calif. Room is 87x95 ft., ceiling 14 ft., surfaces white. Colovolt cold cathode rows are 12 ft. 6 in. apart. The 8-ft., 40-watt lamps total 308. After 500 hours service, intensity was 22 ft.-candles. Load is 1.6 watts per sq. ft.

Interior lighting at Chadwick's Dining Room in San Diego combines 500-watt silver-bowl indirect fixtures with 200-watt, louvered, recessed direct units. The installation provides 15 ft.-candles in the main dining room and 20 ft.-candles in the kitchen (not shown)

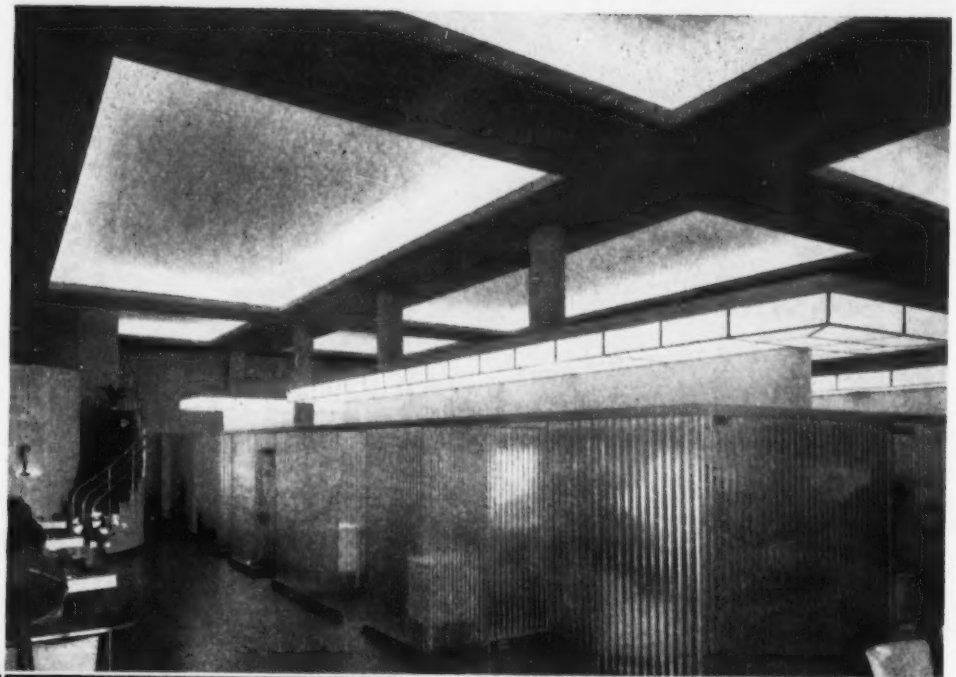
After 1,000 burning hours, General Insurance Co. of America, Los Angeles, was getting 56 ft.-candles on desks, 42 ft.-candles on typewriters from 2,240 ft. of warm white cold cathode. Ceiling is 17 ft. Installation was by Electrical Products Corp., L. A. Division

Dramatic shot of DePuis Beauty Salon, Oakland, leads off this series of pictures showing postwar lighting technique. Slides like these were shown at Western IES meetings. DePuis job uses Cathon—Spott Electric's copyrighted name for its cold cathode jobs

Badon's Cafe, Pomona, Calif., is a combination job. There's a Pittsburgh unit over each of 22 wall-booth tables, with stippled lens and 60-watt lamp. Four 150-watt R-40 floods help give 36 ft.-candles on fountain counter. The continuous rows are Wakefield Grenadiers

Average of 55 ft.-candles is enjoyed by Chandler's Store for Men, Pomona, Calif. Lumidor RG-445, 4-lamp shielded fixtures in continuous row are backbone of job. Holophane Counterlights are on 12-ft. centers. Single row of 40-watt F., surmounts cases

Owl-Sontag Drug Store, also in Los Angeles, has 4,033-sq. ft. store area, 13-ft. 6-in. ceiling. Cold cathode installation after 2,000 hours was giving 54 ft.-candles on counters, 36 measured vertically at eye level on shelves. There are 3,760 ft. of 25 mm. tubes installed



PRESCRIPTIONS

Western Lighting Progress Report-2

Library of Lakewood School, Long Beach, gets better illumination from ten 500-watt Silvray units supplementing bidirectional daylight. Room measures 24x40 ft., has a ceiling which slants from 11 ft. to 12 ft. The walls are light chrome yellow, and the ceiling is white

Deterra Motors, Hayward, Calif., has lighting designed to display cars both for inside and outside viewing. Spott Electric used 20 mm. exposed 3,500-deg. cold cathode on 18-in. centers. Resulting bars of light are interrupted by circular oversets for decoration

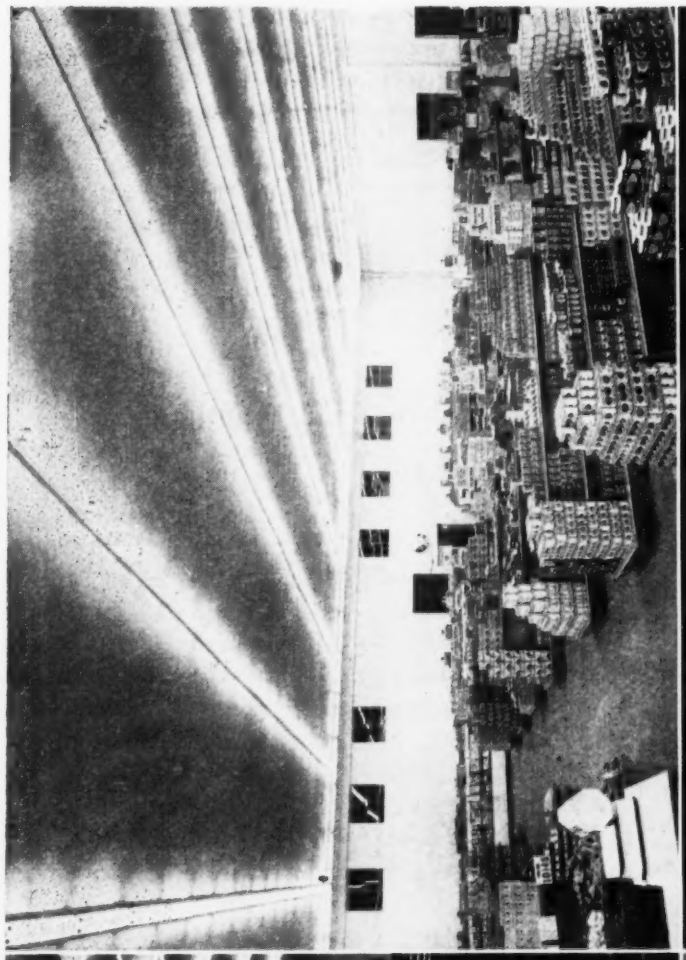
Skytex ceiling makes use of cold cathode set behind diffusing glass to provide an illuminating source of low brightness for El Curtola Restaurant, in Oakland. At the same time illumination is built up to provide lightness, kept free from glare and shadow effect

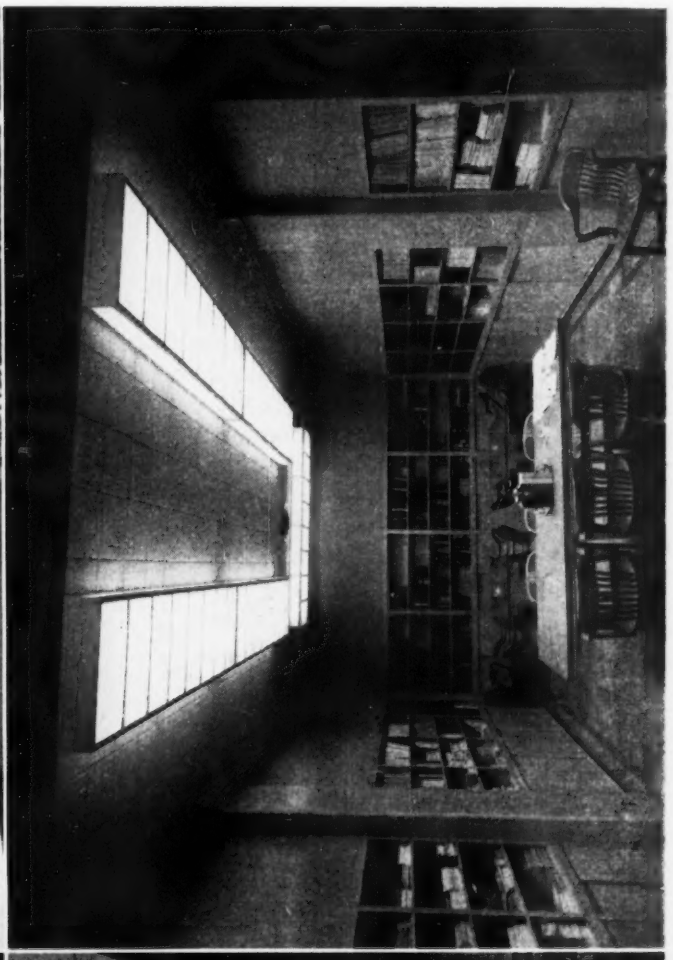
Tim's Bar and Lounge, Alameda, illustrates spectacular effects obtainable by weaving modern lighting into the architecture. Spott Electric used two rows of cerise cold cathode in ceiling, black light on the wall paintings

Night lighting is bringing business to the Maxwell used car lot in San Diego. Poles spaced 40 ft., carry a total of 16 floods at 24-ft. mounting height. Units are No. 90 Goodrich with 1,500-watt lamps. Load of 24 kw. gives 12-20 ft.-candles in the sales area

Exposed fluorescents are used to give the S&K Market, San Fernando, Calif., 58 ft.-candles—measured average after 500 hours. Space is 98x100 ft., ceiling 17 ft., surfaces white. Two-lamp, 40-watt-lamp units total 494 lamps. The main rows are spaced at 11 ft.

Business library of Golden State Co. Ltd., San Francisco, has installation consisting of cold cathode set above fixtures of diffusing glass. Here the objective is light for reading. Remarkably glare free, job is giving 55 ft.-candles as the average intensity in service





ELECTRICAL WEST

McGRAW-HILL COMPANY OF CALIFORNIA
68 POST ST. SAN FRANCISCO 4

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Can Heating Be Kept Cool?

ELECTRIC heat for homes seems to be one of those things which, having caught the public mind, is coming into demand whether the time is ripe or not.

Some Western systems are beginning to suspect that a good portion of the postwar residential load increase is due to heaters being plugged in. Studies, notably in the Portland area, had been got under way (even before that suspicion arose elsewhere) to determine what kind of distribution systems—what order of costs—are going to be involved if the demand keeps building up.

In the midst of this unsettled situation, Seattle City Light has let go with a statement which should at least enable its customers to see where things stand now. In a clearly written brochure, Seattle City Light states that if a customer installs 100% electric heat he can expect his home heating cost to triple and he can look forward to a probable increase in his residential rate, and that soon. The brochure also tells why.

Well-timed and well-executed, this statement may help subdue excess enthusiasm. It may be a greater help in postponing new type load while there's barely enough equipment in sight to take care of standard loads. Its total effect will be followed with interest by systems throughout the West.

For to some the question may soon be: Good or bad, timely or premature, what's to be done about a load that's already on the lines?

More Bottlenecks

A LIVELY controversy appears to be in the offing over the extent to which the power companies should subsidize efforts to break the wiring bottleneck that is holding back the more extensive utilization of heavy-duty electric appliances like the range and water heater. One of the most serious sales resistances to wider acceptance of these two fine services by the public has developed to be the high cost of wiring. Along with everything else in which labor is a relatively large item of cost, wiring has zoomed toward the stratosphere. The prices quoted for installing ranges and water heaters in old homes today appear to be out of all reason—$100 or more, where before the war they were $40. There is a growing belief in the minds of some power company sales executives that if the cooking and water heating load is to be encouraged and expanded, then some part of the installation cost will have to be borne by the utility. In years past this was done on the theory that this new load merited that kind of promotion. Then most utilities dropped the practice entirely, and with some relief. Now it seems as though the practice will have to be resumed if the cooking and water heating load is to be encouraged.

Recognizing an Art

FOR some forty years illuminating engineers, being engineers and mechanically and mathematically minded, have sought the answer to their questions in mathematics and rigorous scientific principles. It is interesting that at both the recent Quebec convention and in the three regional conferences held by the IES in the West, reported herein, the *art* of illumination was discussed along with the engineering. This is significant.

Art touches more closely upon human reaction, emotional response, feeling rather than physiology. Some of the insurmountable difficulties with which lighting men have struggled derive from emotional resistances which no logic can reach—custom, habit, traditional attitude, romantic wishes, memories and pictures of past drama. Home lighting especially has suffered from a complex mass of women's feelings about how her home may be dramatized and she glamorized in its setting. Stores which appeal to women shoppers have a display or dramatic attitude toward lighting that well-reasoned seeing engineering has been unwilling to countenance. Recognition of these psychological aspects may lead to appreciation of this fact.

Had Enough!!!

EIGHT proposals for establishing PUD's were turned down by Oregon voters in the November elections. It was a clean sweep. Besides indicating a decided aversion for government-operated electric systems, the outcome of the several elections pointed to the necessity for an early change in the fundamental Oregon law governing the establishment of People's Utility Districts. One of the proposed districts was voted down for the fifth time; another suffered a like fate for the third time and in three areas this was the second straight defeat. Obviously there is something wrong with the legislative procedure which will permit a constant reintroduction of measures for which the public has indicated a decided dislike. Certainly it is not democratic. Rather it follows the technique of the revolutionaries who, by constant repetition, finally convince the public of the wisdom or the truth of their theories. Once in five or ten years ought to be often enough for the electorate to be called upon to express preference or abhorrence for PUD's.

Strike—Struck—Stricken

ONE question for which an answer may be expected when Congress considers new labor legislation is whether the rights of the people are superior to the right to strike when public health and safety are threatened. Strikes of utility workers fall in this category. So also do strikes of public servants—employees of government.

Various means of preventing such strikes—potential catastrophes in the case of electric utility workers—have been suggested. Compulsory arbitration is one proposed remedy. Many of the remedies proposed for labor disputes in general have been offered as potential checks on utility strikes. One suggested preventative is the legal course adopted and then dropped by the city of Pittsburgh. In that case the community itself sought an injunction under the common law. Its petition to the court contended, in the case of the company, that "the operation of a public utility carries with it the responsibility of establishing a fair and sound labor relations policy. Public utility companies which fail to render adequate and continuous service to the public by reason of their failure to maintain proper labor relations, are not entitled to enjoy the franchises granted them and cannot relieve themselves of responsibility to render service."

The city's legal position with respect to the utility employees was equally pertinent: "The members of the independent association who elected to work for this utility and its associated companies are quasi-public servants. The acceptance of public utility employment carries with it an obligation to maintain the functions of the utility in continuous peaceful operation and to resort to orderly processes for adjusting labor disputes."

While both of these contentions are in the public interest, it is debatable whether their interpretation or enactment into law, would help matters.

If laws are to be the only means of preventing these strikes, then we are in favor of their early enactment. However, we would like to believe that some basis for minimizing the effect of such strikes might be worked out jointly between management and labor. Perhaps representatives of the utility industry associations and utility employees unions, meeting in Washington this month, will work out a practical system for avoiding future strikes. It would be a worth-while accomplishment.

THE American people clearly recorded their verdict in favor of a complete return to free competitive enterprise. Now the time has come for government, management and labor leadership to cooperate to make the enterprise system function effectively and to give the people what they want. From government, the enterprise system needs sympathetic encouragement and action to remove impediments to enterprise . . . From management, enterprise needs bold initiative in completing the return of the economy to a peacetime productive basis, together with self-restraint in readjusting prices for full and expanding production. From labor leadership, enterprise needs self-restraint and responsibility in wage demands and in the use of the strike weapon to enforce wage demands. Team-work will reward everybody, especially labor, by hastening the return to economic stability. The country cannot afford a runaway race between wages and prices . . . The nation is now on the road to full production . . . The readjustment is the critical period. This is the period that calls for self-discipline and cooperation by government, management and labor leadership to keep the wheels of industry turning. Once the country is through this changeover from a controlled to a free economy, prices will settle. The tremendous productive potential of American competitive enterprise will pour goods into the market. The resulting prosperity will be shared by everybody. The opportunity to work together for this common good is here.
—William K. Jackson, president, Chamber of Commerce of the United States.

Utilization Challenges Engineers

PROBLEM of most efficiently utilizing existing and obtainable equipment and providing means for supplying the increasing loads demanded by customers of Northwest utility companies is squarely in the laps of the engineering and operating departments of those companies. W. L. Thrailkill, Washington Water Power Co., vice-chairman of the Northwest Electric Light & Power Assn., told the executive committee of the Engineering Section of that association at Spokane, Nov. 21 and 22. These loads have increased since war's end more rapidly than was expected, he said, and this fact has thrown emphasis on the importance of system design, on emergency handling of overloaded areas and on the shortage of equipment and apparatus.

There is no real shortage of electricity in the area, but resumption of the aluminum load since V-J Day has shortened the margin of surplus capacity that was expected to have been available at this time, Thrailkill said. Companies may expect to have to utilize all sources of supply for the next several months if load growth continues at the present rate.

Accepting this challenge, the committee outlined subjects for study and discussion between now and the spring meeting of the section to be held next year and assigned these subjects to its standing committees.

R. J. Davidson, Pacific Power & Light Co., section chairman, presided at the meeting, announcing the following committee chairmen: power production, A. L. Pollard, Puget Sound Power & Light Co.; transmission and distribution, C. H. Kirk, Montana Power Co.; electric equipment, J. Hellenthal, Puget Sound Power & Light Co.; utilization, John Bankus, Portland General Electric Co.; code, M. T. Crawford, Puget Sound Power & Light Co., vice-chairman, acting for S. B. Clark, Northwestern Electric Co., chairman.

The electrical equipment committee reactivated a subcommittee on meters and services and organized a new subcommittee on electronic equipment involved in radio communication, telemetering, carrier, supervisory controls, etc.

O. L. LeFever, Northwestern Electric Co., chairman of a special committee on the engineering phases of electric house heating research, reported on having outlined a method for a study of the cost of furnishing house heating service by individual companies, and also on having produced an outline of data to be secured from the testing of house heating installations, which is being carried on by several companies this winter.

The spring meeting of the section is to be held in Portland, and the dates are to be announced as soon as arrangements have been perfected with a headquarters hotel.

In picture are: seated, M. T. Crawford; John Bankus; L. R. Gamble, Engineering Section vice-chairman; R. J. Davidson, section chairman; W. L. Thrailkill, association vice-president; O. L. LeFever, A. L. Pollard; standing, H. H. Schoolfield; H. M. Jones; E. H. Collins; Joe Henkle; Joe Hellenthal; Berkeley Snow

Municipal Group Meets

Rates, personnel and general operating matters were discussed at the annual meeting of the California Municipal Utilities Assn. at Riverside, Calif. Nov. 7 and 8.

Future rate reductions measured in cents per kilowatt-hour or money should be postponed at least until the effect of rising costs can be evaluated and schedules determined on a sound basis, is the opinion of Lester S. Ready, consulting engineer, who spoke on utility rate trends. If increases are necessary they should be made promptly and before the temporary recession that may be expected within two or three years, he said, adding that future revisions in domestic schedules should not be dictated by the extremely low rates promulgated by the federal agencies. Pointing out that California municipalities have not so far been intrigued to any great extent by the politically expedient rates proposed by TVA and Bonneville, he warned that the federal authority is pushing its ideas and utilities may be faced soon with the necessity of combating the

government's unsound domestic rate program.

Samuel Morris, manager, Los Angeles Department of Water & Power, stated that over-all utility costs have increased 29% since 1935, reflecting the rise in labor and material costs, but expressed the belief that we are near the peak of prices and costs. Expectancy of leveling costs plus faith in ability to lower unit costs through expanding utilization has lead utilities to make rate reductions within the past year, he said, adding that he did not believe increases would be necessary.

The conference room and a cooperative attitude, not laws, are the antidotes to strikes, according to Thomas Neblett, labor relations consultant. Most disputes arise from ignorance and distortion, he said, and management should take the initiative in ironing out grievances.

Carl A. Heinze, consulting engineer, analyzed factors affecting choice of unit size for small utilities and said that substantial economies offered by outdoor or semi-outdoor generating plants should not be overlooked.

Ray Mathew, chief engineer, Colorado River Board, stated that California must be prepared to fight to protect its rights to Colorado River water when legislation seeking diversion of water for two large Arizona projects is introduced in Congress. Ray Eberhard, association attorney, told of the attempt of private and municipal utilities to force the state to stand all or part of the cost of the multi-million dollar freeway program.

Glenn A. Baxter, secretary, Alameda Public Utilities Board, and F. V. Frey, supervisor, Pasadena Light & Power Department, were re-elected president and secretary, respectively.

● R. J. Crump of Smoot-Holman Co., Los Angeles, chairman of the educational division, Illuminating Engineering Society, Southern California Section, has been conducting a 40-hour class in illumination at the Frank Wiggins Trade School in Los Angeles. The class meets for four hours, from 6 to 10 p.m. for ten weeks, and covers the fundamentals and application of illumination engineering practice. It is being given to regularly indentured electrical apprentices.

● Electrical contractors doing line construction are to have a section or a "special benefit activity" under the National Electrical Contractors Assn., according to a recent announcement. A committee has been appointed to consider proposed by-laws for a line construction contractors section to be presented at the NECA convention at Atlantic City. R. B. Lane, Seattle, is the West Coast member of that committee.

PCEA *Panorama* — *Edited by A. X. Schilling*

Kramer Explains Certification

Elbert Kramer, chairman of the adequate wiring committee, explained the certification standards of the association's adequate wiring program to members of the Pacific division of NEWA during their meeting in Sonoma on Nov. 14. He pointed out the increased market for wiring materials among wholesalers as a result of adequate wiring activities and asked for the support of the group in furthering the program.

Kramer also addressed the meeting of the southern California chapter of IAEI in Burbank on Nov. 20 and reminded the group that the duties of an inspector can mean more than policing. He said that inspectors can often be of assistance to the cause of adequate wiring by informing the public that local ordinances are safety provisions only, and that adequate wiring specifications presume that local ordinances are complied with, and set standards that enable homeowners to derive full benefit from all electrical appliances and installations. Copies of the adequate wiring specifications and sample pages from the promotional booklet being prepared by A. X. Schilling, chairman of the publicity committee, were shown to the group and elicited considerable interest.

Booklet Ready

The booklet entitled *How Your PCEA Operates*, prepared by V. W. Hartley, managing-director, which was approved at the Nov. 9 meeting of the board of directors in Phoenix, has been sent to the printers and will be available for distribution soon. Copies will be sent to all members and to prospective members.

PCEA Facts

PCEA has 193 company members, an increase of 55% during the past two years. Personal memberships have grown more than 400 during the same period, now total 2,330.

PCEA developed the Uniform Electrical Code, has revised it to meet changing conditions and kept it alive and healthy for 17 years. It has been adopted in 91 cities, 3 counties and 1 fire district in California, has proved to be a real help to the electrical industry.

PCEA has published the following: Air Heating Manual, Water Heating Manual, Farm Electrification Handbook, Industrial Power and Heating Handbook and the California Climatological Survey. Sorry, but the first two are no longer available; the next two are being revised and will be available again soon; and the fifth one is available now.

PCEA territory includes California, Arizona, Nevada, Hawaii and the Philippines.

Getting Acquainted

(As space permits, we plan to present in this feature some of the men who have given their time and talents to keeping PCEA successful).

This month, we'd like to have you become better acquainted with a likable energetic fellow who was born in San Francisco soon after the advent of the twentieth century. He went to school in that city and worked there for the Wells Fargo Bank and for the John G. Rapp Co., radio distributors. He was married twenty-three years ago and has two sons, aged 15 and 20.

He has been active on the business development committee for several years, and now is lending his services to the code and ordinance committee, for which he served as chairman for several years. He's a member of the board of directors and a vice-president of PCEA.

His hobbies are riding and training horses, camping and fishing, playing poker and pool. He lives in the Flintridge section of Pasadena.

Until 1944, he was vice-president and general manager of the southern California division of the Leo J. Meyberg Co., for which firm he previously worked in San Francisco. Then he became president of Radio Television Supply Co. and co-owner and general manager of the Sues-Young Co., Los Angeles.

(For identification, see page 104)

Prices and Credits Steal Show

Wholesalers meet at Sonoma to study operational problems but OPA's collapse makes price change talk overshadow the rest

ELECTRICAL wholesalers from the eleven Western states dropped the theory and guesswork that had been forced on their wartime meetings, and settled down to practical business sessions full of down-to-earth studies of current business problems during the Pacific Division convention of the National Electrical Wholesalers Assn. at Boyes Springs, Calif., Nov. 13-15.

They met to take part in a program that offered them expert, timely treatises on buying and credit practices, that brought top authorities to discuss regional business outlook, adequate wiring, industry interdependence—but it was the news of the day that stole the show. Government decontrol of prices, announced just as the wholesalers were preparing to convene, took the attention of every wholesaler, manufacturer, agent and guest. To the previously quiet, rural atmosphere of California's Valley of the Moon came the constant sounds—"schedules—discounts—the latest word from the East—how am I supposed to know yet?—it'll change anyway—I wired to jump everything 20%."

The program was highlighted by papers on important operational problems: *The Credit Situation As It Applies to the Supplies Wholesaler*, by L. C. McDonald, General Electric Supply Corp., San Francisco; *The Credit Situation As It Applies to the Appliance Distributor*, by R. L. Henry, Gough Industries, Los Angeles; *Buying Practices*, by H. E. Perl, State Electric Supply, Oakland; *The Future in Appliance Distribution*, by L. E. Starkweather, Leo J. Meyberg Co., Los Angeles. Supplementing these papers on operational problems were talks by Elbert Kramer, Westinghouse, on *Adequate Wiring;* by F. T. Letchfield on *An Engineer's Appraisal of the Current Outlook;* and by N. J. MacDonald, The Thomas & Betts Co., on *Industry Interdependence.*

Watch Credit

"There's trouble ahead, and lots of it," said L. C. McDonald, as he looked into the future credit situation for the supplies wholesaler. He noted the mass of new contractors that had entered the construction field, cited the figures that show that only two or three of every ten new ones will succeed in the long run. Yet, he said, to these new contractors will go the initial backlog of residential and small industrial work, therefore they must be given consideration.

Because the wholesaler will have to deal with this new group of new customers, he will have to establish credit practices and policies that will enable him to exercise shrewd judgment on the amount of credit to be extended and the length of time it is to be carried.

There is now no way to tell which of the newcomers in the contracting field will make out, but it is certain that out of these new ones will come the big, successful contractor-customers of the future. Each requires personal attention, he said, but there are four basic rules that should be followed: (1) Establish minimum requirements which will give even the smallest newcomer an opportunity; (2) keep in personal touch with new accounts to watch for the danger signals; (3) don't be misled by quick payment in the first few months—most trouble comes in six months; (4) be sure that the contractor is thoroughly familiar with the credit terms when the account is opened.

Appliance Credit

The appliance-handling wholesaler has ahead of him six months which will be a hazardous period for appliance retailers' credit, according to Roy Henry. With dealer mortality already in evidence, he said, the appliance dealers that have survived will be put to the crucial test between now and early summer. He warned wholesalers to establish a vigil on credit that would save them from out-of-proportion dealer loss.

As one aspect of this vigil, Henry recommended that wholesalers hold tight to a ten-day payment period for their dealers. He pointed out that there is so much bank credit available today that it is not difficult for the dealer to finance the small quantity of appliances which he has to hold on the floor, and there was no valid reason why the dealer should carry his own paper on installment accounts.

Appliance Futures

Appliance distributors in the West take on an added responsibility as they assume the new, large market that has developed here, according to Lloyd E. Starkweather.

Citing the tremendous gain in the appliance market in the eleven Western states—a jump from 12.9% of the nation's potential in 1939, to 15.1% in 1946—Starkweather said that this was a challenge to the distributors to prove through efficiency and low-cost operation that they were the best method of distributing appliances. "There are rocky roads ahead when the distributor must be ready to meet the most severe competition ever—competition between distributors, competition between methods of distribution," he said.

In preparation for this competitive period, the distributor should start by

Opening day speakers, from left: L. C. McDonald, G-E Supply, San Francisco; F. T. Letchfield, Wells Fargo Bank, San Francisco; Charles W. Goodwin, G-E Supply, San Francisco, division chairman; Elbert Kramer, Westinghouse Electric Corp., Los Angeles, and R. L. Henry of Gough Industries, Los Angeles

screening his dealer lists. He noted the false picture that can be seen by the inexpert today—a steadily increasing volume for all dealers, increases in prices that boost gross income, but in themselves factors that foreshadow the break—first the full warehouses, then the price cutting, then a test of dealer's ability to merchandise. Starkweather believed that the buyer's market in most appliances would come early in 1947, and before the end of the year for the rest of the appliances.

In discussing the future for appliance distribution, Starkweather emphasized the function of distributors' salesmen and distributors' sales management. He said that most wholesalers had on their staffs many salesmen who have got to be trained in a very short time to do the all-important job that in the past went to men with many years of close work with the dealers.

Of particular importance, he said, will be a very close supervision of the sales force, both to provide the salesmen with organization and system, and also to keep management closely informed about what is going on in the field. In the near future, close contact with the salesmen can be of special help to the credit department, too, and he advised a special report from the salesmen to the credit manager—a report separate from the formal credit reports on the dealer, a few notes from the salesman which would give the credit manager an idea of the dealer's personal habits, attitude, relation with customers, neighborhood gossip, etc.

Buying Needs Emphasis

"An orphan in the wholesaling business," was the term applied to purchasing practices by Harry E. Perl, Oakland wholesaler and past chairman of the Pacific Division of NEWA, in a paper presented, in Perl's absence by R. A. Balzari, secretary. Perl pointed to buying practices as one of the most important functions that would keep the wholesaler in a strong competitive position in the future.

"We have been buying because we sell—we should buy to sell," Perl stated. "We must keep foremost in our minds the Siamese relationship of 'buying and selling', of 'turnover and profit'."

In his discussions of buying practices for the wholesaler, Perl's paper pointed out the use of stock records to prevent inventory stagnation—emphasizing that these records were valuable only so long as the purchasing man interpreted them, used that information in his buying, and at the same time passed the knowledge along to sales and management.

Guest speaker at the opening general session was F. T. Letchfield, assistant vice-president of Wells-Fargo Bank and Union Trust Co., San Francisco, who gave an *Engineer's Appraisal of the Current Outlook*. He outlined the economic trends regionally and nationally and analyzed the effect of these trends on the electrical industry in the eleven Western states.

L. E. Starkweather, Leo J. Meyberg Co., San Francisco, and N. J. MacDonald, The Thomas & Betts Co., Elizabeth, N. J., speakers at the closing session

As guest speaker of the convention, N. J. MacDonald, vice-president, The Thomas & Betts Co., Elizabeth, N. J., wound up the second and final general session with an address on *Industry Interdependence*. He supplemented his talk with an enthusiastically received personal report on business conditions within the electrical industry as he had seen them during recent trips through the East and in Washington, D. C.

The program of the Pacific Division's convention, which lasted three days, included closed sessions for association business, the traditional "Dutch Treat" social stag on opening night, two afternoon golf programs, and the Friday evening golf banquet at which N. J. MacDonald acted as toastmaster. Breaking tradition, the wholesalers included their ladies at this affair.

Charles W. Goodwin, chairman of the Pacific Division, presided at all the meetings. D. A. Smith was chairman of the convention committee, which included B. S. Manuel and F. C. Todt. The program was arranged by Charles W. Mathews, with E. E. Karsten, L. E. Starkweather and H. C. Gerster as members of his committee.

They Plan for Sales at NWEL&P Meeting

PLANNING for a year's active work to reach a climax at the annual spring meeting, the Business Development Section, Northwest Electric Light & Power Assn. organized its bureaus and committees under the direction of Henry R. Kruse, Puget Sound Power & Light Co., chairman, at Seattle, Nov. 18 and 19. The meeting was attended by 32 section members including James H. Polhemus, Portland General Electric Co., president of the association, who warned the group that now was the time to develop selling programs against the day when the sellers' market will have changed to a buyers' market and real selling would be necessary in the competition for consumer preference.

The group decided on the dates of April 30 and May 1 and 2, 1947, for the spring meeting with the place set at Seattle, and programs of bureaus and committees were outlined to cover important phases of selling and development in their respective fields.

In his opening talk, Polhemus also pointed out that with the resumption of the aluminum industry in the Northwest, power supply was not as plentiful as it was expected to be at this time but there was no danger of a real shortage. We are going to have to do a better job in our territories than the PUD's and we will have to do this job in the face of rising costs, he said.

Patrick Johnson, vice-president of Puget Sound Power & Light Co., and immediate past president of the association, urged the section to carry on the intra-industry forum tried out last year. He recalled to the group that under his administration the association had expanded its activities to include appliance dealers, electrical contractors and a broadened membership among electrical manufacturers and wholesalers, and that now the association was the only organization in this territory broadly covering the entire industry.

Plans for the spring meeting developed by the sales promotion committee under John H. Taylor, B. C. Electric Railway Co., Vancouver, followed this suggestion by recommending that an entire day of that meeting be given over to talks by dealers, contractors, jobbers, manufacturers and finance people directed toward a coordinated program for meeting the competition for the consumer's dollar inevitably to come. G. Langtry Bell, Clarksons Ltd., Vancouver, B. C., will aid in stimulating dealer participation in this program.

O. A. Alderman, Bussmann Mfg. Co., and F. T. O'Brien, Graybar Electric Co., Seattle, representing their respective groups, expressed the belief that 1947 appliances would be ready for showing at the spring meeting.

Adequate wiring, a subject of much interest, was handled by a new bureau under the chairmanship of J. F. McAllister, Utah Power & Light Co. This bureau proposes to bring actively into its program electrical contractor representatives from each of the several centers in the territory. R. D. Horning, secretary of the Electrical Contractors' Assn. of Seattle, will take an active part in this organization.

W. L. Thrailkill, Washington Water Power Co., vice-president of the association, reporting on the new Research Advisory Service put into action by the association last summer, stated the service had handled 327 technical problems for industrial customers of the eight participating utility companies.

Highlights of other bureau programs:

Commercial and industrial. D. O. Bergey, Northwestern Electric Co., chairman—investigate seam and spot welders, power factor correction and induction and dielectric heating.

Electric home, Earl A. Olson, Idaho Power Co., chairman—emphasis on home service and on dramatizing water heating selling. Continue studies of electric house heating, particularly auxiliary heating.

Rural, A. G. Mayer, Washington Water Power Co., chairman—eleven subjects including farm refrigeration, sprinkler irrigation, hay and pea vine drying and barn cleaning.

Advertising and publicity, Ralph Millsap, Portland General Electric Co., chairman — examination of opinion measurement techniques, visual aids as advertising and educational media in sales promotion, and agency relationships.

The industrial development committee was continued under the chairmanship of C. T. Bakeman, Puget Sound Power & Light Co.

Howard Walters, B. C. Electric Railway Co., was appointed vice-chairman of the section.

● THE FACTS OF LIFE about electric heating are presented in a straightforward little pamphlet just issued by Seattle City Light to answer its customers' questions regarding that service. It frankly states that the municipality cannot afford to heat homes at its present domestic rate and that for full house heating a higher rate may become necessary. It advocates electric heating for auxiliary heating because as such it will not load the peak and require extensive generating and distribution increases for seasonal use only. It makes a strong point that "it is true that lighting, cooking, water heating, refrigeration, small appliance and auxiliary heating with two or three thousand watts can be done cheaper by electricity than by any other method."

Christmas Lights Return

Business districts everywhere decorated but of course Hollywood goes colossal with its own Santa Claus Lane

M. L. Gordon
Los Angeles Department of Water & Power

THROUGHOUT the West, no doubt, the streets of business districts are being decorated for out-door lighting. But from all accounts no other city goes into it on such lavish scale and in so many districts as does Los Angeles, where in Hollywood 630 kw. of lamps are used to light a mile of Santa Claus Lane; where the downtown business district tries to match Hollywood and hold its trade and in all some 25 districts seek their share of business attraction by elaborate Christmas decorations.

In these 25 districts a total of 1,700 kw. of lighting load is connected, most of it running from Nov. 15 through New Year's Day, and it is estimated that 485,000 kwh. will be used during that period. Broadway and Seventh streets in downtown Los Angeles have a 150-kw. connected load this year, not quite as elaborate as last year but still spectacular.

This program, started several years before the war, but completely curtailed during the war, is being revived this year, bigger and better than ever. In previous years, approximately 50 different communities throughout the city joined in this program. Sponsored by the various public-spirited groups of business men, civic organizations, clubs, etc., the street decorations, beautifully lighted, impart a joyous Christmas atmosphere to the city and stimulate Christmas shopping.

The public, of course, sees only the results. The back-of-the-scenes effort, however, to produce the results, is really tremendous. Long before Christmas each year, the sponsoring organizations start to formulate their plans. First, money has to be provided and this is a real item because such installations are expensive. Then the nature of the decorations, the theme to be followed, and the entire program must be decided upon before any work is started. The letting of a contract or contracts for the installation and removal of the decorations is quite an item because of the necessity to properly maintain the installation to conform with all city safety regulations, to obtain permission from the California State Railroad Commission where streetcar lines are involved, and to protect the organization from possible damage suits in case of accidents.

The Los Angeles municipal Department of Water & Power cooperates by supplying all of the energy needed to light the decorations, without cost to the sponsoring organizations. It does this for two very good reasons. First, it firmly believes that such programs are not only of definite community benefit, but also of benefit to the city as a whole. Also, from a hard-headed business standpoint, it knows that, where such decorations are installed, the increase in revenue resulting from the additional lighting effects installed in the stores and the longer hours that the stores stay open where such programs are in effect, more than doubles in returns the entire cost to the power department.

On some of the larger projects, the contractors really have some difficult problems to solve. Santa Claus Lane in the heart of Hollywood is one of the most elaborate installations attempted. All of the decorations, as well as all of the wiring, were planned, built, and installed by Otto K. Olesen in years past but this year several other decorative contractors are handling it.

Santa Claus Lane is one mile long, extending from Argyle Ave. to Orange Drive. The installation consists of 100 illuminated trees, 50 on each side of the street, erected around the street lighting electroliers. Each tree weighs 1,200 lb., is 25 ft. high from the sidewalk to the tip of the star, and is illuminated with 175 colored bulbs. Between each pair of trees there is hung, spanning the street, six spun-aluminum bells and four illuminated stars. Each bell is 36 in. high and 30 in. across the base, is perforated with tiny holes to allow a sparkle of light to shine through and is lighted inside with a 500-watt bulb. The connected load totals 630 kw.: more than 12 miles of feeder wire, 10 miles of wiring within the trees, and 5 miles of guy wire, were required in this project.

Yes, it is a tremendous undertaking but the results justify the work and effort involved. Christmas-out-of-Doors in Los Angeles is becoming a tradition and undoubtedly will become more generally observed each year.

ELECTRICAL WEST
Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © DECEMBER, 1946

It's the Season for Lamp Sales

IT is the season for lamp sales—all kinds of lamps. Not to make the most of such an opportunity when all other lines of electrical goods are still so scarce would be foolish. Even if the selection of lamps is not all that you would wish, at least there **are** lamps to sell, and that is something.

Need the reasons for pushing lamps now be told even, they are so obvious. The dark season is here. It gets dark early. Homes need the cheer of attractive lamps. They need more light for everything. School work study time requires better light for seeing. Besides all the children going to school, think of the hundreds of GI's doing so too

Even though built-in lighting may be the thing of the future, it can't be done these days for lack of materials and equipment. The experts on perfect home lighting, talking to the Illuminating Engineering Society regional conferences on the West Coast recently agreed that the existing home will have to be relighted with portable lamps. Even the new GI homes can't do much more than provide outlets and some minimum ceiling fixtures these scarcity days.

So settle down to selling floor, table, end table and boudoir lamps for a long time to come. They are what the public is used to and what women shop for.

Did you know that instead of the IES lamp of prewar days the lamp manufacturers themselves are forming a group to have lamps tested and certified and advertised as the IES lamp used to be. It will be called the Certified Lamp Manufacturers. The Illuminating Engineering Society has given them the performance requirements. The Electrical Testing Laboratories, which did the testing and certifying before, will handle the job again. There will be a whole family of "approved standards" lamps.

So get ready for this new program by clearing stocks now and making the most of the lamp demand. Inside are some good tried and proved sales ideas for moving lamps.

Lamp Sales Appeals

Besides the construction details of the lamps you sell, in your advertising—be it newspaper, showcard, display card or background, and even on price tags—why not use a few words to stir the appetite? Stir the imagination and arouse the feeling of need by using some of the fundamental sales appeal of good lamps and good lighting.

Even if you do not use these very words (though they are free for you to use if you wish), saying something like them will increase the punch of the words you use to give a description of the merchandise. They create pictures of the benefits to be enjoyed through the use of the lamps. Why take it for granted that all customers know these benefits? Many have never thought of them. In simple language, here they are:

Brighten the home—These lamps add cheer and color to the home. With good lighting colors look true. Decorations and details of home furnishings are seen at their best. People look healthier and happier. There are no unflattering, harsh shadows to make them look old, tired, cross or wrinkled. Glare causes frowns and unpleasantness. In a well-lighted room there is no need to frown.

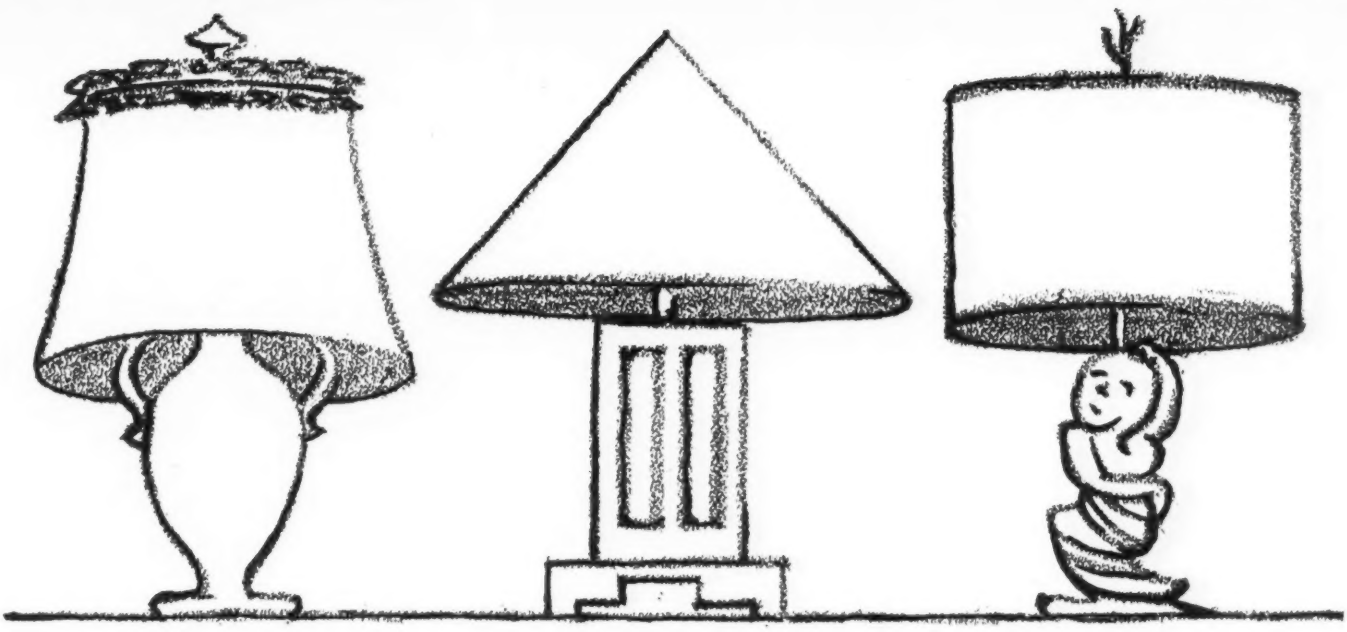
Saves eyesight—Sight is the most precious of all senses. We receive 85% of all our knowledge through sight.

Loss of eye efficiency necessitates expensive medical attention. Poor sight cuts down the ability to do things and to enjoy life. Good lamps give good light for aid to good seeing.

Speeds seeing—In darkness or semi-gloom the eye has to reach hard to try to see. It sees slowly. Therefore good lighting makes reading, sewing, handicraft work of any kind faster and more accurate. It helps the student to pick up his homework faster.

Safer—Where there is plenty of light the chance of accidents is reduced No half-seen or unseen objects lie in wait to be tripped over. It is very false economy to use too little light.

Healthier—Good lighting makes it natural for children to sit up straight when studying or reading and thus preserve good posture. They twist around when trying to see or to try to avoid glare. Eyestrain often leads to headaches and physical discomfort.



Courtesy is the Light of Trade

If there is one thing that is scarcer than merchandise these days it is courtesy. What an opportunity it gives the store that makes courtesy its strong feature!

No matter what the excuse for grouchiness and irritation; no matter how dumb or trying customers do seem sometimes, after all it is their business that brings in the wherewithal to pay the wages or salaries or commissions that keep the store going. You are a customer yourself sometimes and hate to be treated like dirt.

Business is positive. It goes to seed if it has to be negative. It hurts to say "No" to a customer who wants an appliance you wish to heaven you did have so you could sell to her. But it is better to say "no" in a way that is sympathetic and indicates that you want to serve, and keep the good will and friendship of that customer, than to have her keep in her memory a hurt to her pride that may decide a sale against you sometime in the future.

Competitive days are here again. The supplies of merchandise are flowing more freely. Demand is slackening right now and customers are becoming more choosey. When there are so many dealers in the field and all offer approximately the same merchandise at about the same prices, it will be the slight edge that courtesy gives that may determine who gets the sale.

On the whole, electrical dealers are the most courteous and helpful in the business world, the editors have found in their contacts and purchases. They have more problems to make them irritated, too, in most instances. Shipments are slow. Goods have come in badly damaged. Some appliances have given a lot of service trouble. Margins have been short and permit little in the way of such extra costs. Customers have had to be kept waiting long and inconvenienced for lack of really necessary appliances. All these have been a plague of boils that Job would moan over.

Despite it all, electrical dealers have been cheerful and helpful and have built good will.

As business enters a new phase of strong competition this cheerfulness will be a stronger asset than ever. The competition will be coming from other businesses, which are after the purchasing dollar of your customers, more than it will be from fellow dealers. It will be a time to sell all the service features of electrical appliances, the benefits and advantages.

Next year's series of **Sales Guides** will reflect this change of emphasis. This year they have dealt with business fundamentals, and ideas and methods to operate a business soundly. Lack of merchandise made it unnecessary to go into selling methods strongly. But the tide has turned and selling again will be needed. So these Guides will bring, from all of the West, the best, most successful ideas and methods.

Electrical West—Vol. 97, No. 6

There's Business - if you Please

Concluding this series of good sense articles on business management

By Ken Hampton

MERCHANDISING still is fraught with all the romance of rural trade. True, we sometimes lose the thrill of its world-wideness in trying to fill our necessary place as merchants in a distribution system that has become highly complicated by manufacturing and population concentrations. Still, it is there, the bringing of goods from all corners of the universe to the finest people in the world, our customers.

The fact that we now bring not just foodstuffs—for instance, dates from the Orient; or clothing—such as furs from Alaska—but complicated machinery worked through many complicated processes from mines and mills, intensifies the romance that surrounds our goods. Now much of our merchandise is the story of people—many people living and working under vastly different conditions; people who mine, people who operate railroads, ships and trucks; people who work in big factories; people who do research work and long-time planning. Today more than ever before our products are the combined results of man's efforts. The merchant should trade on this fact in his selling and advertising.

People are always curious about other people. They like to know how they live, how they work, what they think and what they look like. These things are all wrapped up in our merchandise. The story should be told to our customers. It will please them and make them proud of the merchandise they buy from our store.

The successful conduct of the merchandising business depends upon following closely a few simple rules that revolve primarily around people. For the most part these rules have to do with **pleasing people** and so are just the ordinary rules of **friendliness, courtesy, honesty and fair dealing.**

It is the wise merchant who holds his organization strictly attuned to the prevailing characteristics of his community, be it agricultural and conservative, or mining and extravagant, or any gradation in between. Peculiarly, however, a smile and friendly greeting may weigh equally in any business success.

The future of merchandising success, your success and my success as individual merchants and the success of our stores, will depend upon how well we can use the experience gleaned from our own present and past experience and the experience of our associates and those who went before us. This is why merchants like to talk trade so incessantly with each other when events throw them together.

It has been said that "nothing is constant but change." The distribution of goods to consumers is constantly under pressure of competition and public criticism to become more efficient. By concentrating our thoughts on the job, improvements can be made.

As we think on a subject we attract all the necessary ideas for its accomplishment. Thoughts are materials to work with. How well we use these materials depends upon the concentrating of wide experience and intense thought upon a single subject. In our minds we must judge future events in the light of past experience.

This experience has proved to us that important to all merchandising is **pleasing people**—pleasing all people all of the time—because all people, employees as well as the people who sell us our goods, are not only potentially our customers, but are **walking advertisements** telling the world about us. They either like us, our store, our merchandise and our way of doing business or they don't and they tell their friends about their likes or dislikes.

Whenever a merchant pleases a person, his business grows a little—when he displeases it shrinks a little. For that reason we presume to close by saying that **the cardinal rule of merchandising success is to find the things that please people and do more of them—and to find the things that offend people and do less of them.**

ELECTRICAL WEST Sales Guide

NEWS LETTER FOR THE ELECTRICAL MERCHANT OF THE WEST

December

1946

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All prepared with more hopeful forecasts for appliances soon, manufacturers' and distributors' men clammed up when John L. Lewis pulled his coal miners, not knowing but fearing what that would do to their implied promises. Things were rolling along at as-good-as or almost best prewar production levels in most appliances up 'til then. Unpredictability of steel, copper, lead, glass and other supplies to make things with and rumblings of more wage demands and possible strikes makes any prediction risky.

No predictions

A second wave of new store openings has been noticeable in the West, despite many of the first wave now offered for sale. Several big chains of appliance stores have put new stores in already crowded areas, bringing with them franchises which overlap those already granted for the area and causing considerable gripe.

Some new some out

Prices rose a little following the collapse of OPA last month but the most significant thing was the restoration of prewar dealer margins by a number of manufacturers. Margins had been squeezed by price increases granted manufacturers but not permitted to be passed on to consumers.

Margins restored

Removal of price ceilings means that price floors may soon take pressure too. While many more manufacturers went to Fair Trade agreements than before, the old Federal Trade Commission still doesn't like them. So, if you like Fair Trade prices on trademarked goods better prepare to defend the idea by arming your congressmen and the public with reasons why. There is bound to be price cutting pressure from some of the traditional volume and cut-price merchants.

Fair Trade

Regulation W still holds on refrigerators, ranges and some other major appliances but department store accounts are free.

Time pay

A flock of economists were given the crystal ball recently to come up with prospects for 1947. All agreed that there would be further price increases before they start to go down. Production should catch up with demand early in the year, after which there may be a slight recession until you dealers sell your way out of the surplus, then there should be several years of good business. Many felt it would still be a sellers' market on refrigerators most all of 1947.

Crystal ball

Bigger than ever markets are expected this year, starting Jan. 6-18 at Chicago, Jan. 27-31 at Los Angeles and the "Building Ahead" Market at San Francisco's Western Merchandise Mart, Feb. 3-8. This will be followed by a Gift, Toy and Houseware market in San Francisco civic auditorium, Feb. 9-13 and a Northwest gift show in Seattle, Feb. 23-27. Hotel reservations should be made far in advance.

Markets soon

Appliance manufacturers at Chicago's Mart were asked about future deliveries and all predicted that allocation would be continued for some time yet in everything but table radios.

Rationed

Westinghouse showed an electric comforter, not a blanket, at a recent New York television show. Uses only a 150-watt heating element in a removable warming sheet inside the rayon comforter cover. Thermostat control is the size of a powder box. None for the West 'til later. New York and Philadelphia stores are testing its appeal. Was advertised at $49.85.

Electric comfort

Sylvania showed a new lamp bulb to make any table or floor lamp a reflector type -- called Indirect Bolite, it has a flat frosted end and opal glass sides and a simple wire frame comes with it to support almost any kind of lamp shade.

Lamp idea

Interest in FM is on the increase as several new stations in the West have started and others are under construction. FCC has clarified its rules to provide about 98% of the US with FM coverage. AM will likely drop back to 28% coverage from a few clear-channel, super-powered stations with as high as 750 kw.

FM is here

Television will take longer. There's a battle on over color. Bendix Radio has entered on the side of CBS and the mechanical system while RCA heads the electronic color system group. RCA demonstrated a working model recently but says commercial production is a few years off.

Video battle

RCA has been considering the idea of offering a television maintenance service with an annual charge. Figures the complex devices will need expert service and adjustment.

Headache cure .

Sears will offer its mail order customers a "record of the month club", furnishing 12 Vinylite records at about $1.50 each, recorded by Muzak Corp. Will stay away from heavy classics or hot jazz; feature music for background listening.

Club records

Hopax Devices, Inc. of 1 La Salle St., Chicago, which brought out a needed little circuit-breaker plug and electric cookerette has changed its name to Allied Electric Mfg. Co.

New name

A refrigerator with a hole in its door was used by Gimbels of New York to demonstrate how an electric blanket keeps one warm even in the cold. People reach into the refrigerator and feel how warm it is in the blanket.

Hot idea

San Diego's Bureau of Radio & Electric Appliances staged its biggest fall confab Dec. 2. While full story will come in Jan. Electrical West, hot news from the manufacturer quiz is briefed here. Some of it is local, most of it is pertinent throughout the West.

Biggest ever

Fred Fowler Jr., for instance, said his Portland factory is producing water heaters at a 40,000 a year rate. It makes most of its own components. San Diego dealers, he said, have sold 500 water heaters (electric at that) for the year so far, all makes.

Western made

Joe Shull of D.E. Sanford Co. reported Olympic radio production up, Kitchen Aid production up, Camfield toasters having trouble getting suitable steel, Winstead folding irons will be up early in the new year, and that Waring blenders had been filling a big backlog to food places, hospitals and laboratories of industries and would soon be able to fill dealer requirements.

Good news

Ted Ludlum of Coolerator denied the rumor that Coolerator intended to quit making ice refrigerators, saying that it would make electrics for 9 months, ice boxes three months. Production on freezers is at capacity but condensers seem to be the bottle-neck.

Some ice

Bill Kuhn of Easy predicted, with his own factory's and others production as high as 120% of 1941, that before long washers will be sticking out of everyone's ears.

Flood soon

Ray Cox of Herbert Horn Co. cheered with word that Admiral would be able to sample all dealers with dual-temp. refrigerators and ranges in January and have stock for customers by spring. A new line of Admiral radios is due in March, but home freezers have been put off until 1948.

Samples first

E. S. Germain, district manager of Stromberg-Carlson, predicted that television and wire recording will soon be features of all radios. He urged dealers to emphasize music and sell the phonograph of a combination, for people buy music, not radio reception any more. "You get closer to the tastes of the customer with such an approach," he said.

Make it music

Ben Sanderson of Electromaster said that the new plant of this company has now opened and that production is fine.

Expands

George Williams, of Maryon-Williams Co., declared that since the San Diego area had been getting more than elsewhere of Conlon washers and ironers, now that production is up, the company must ship to other areas to even up quotas. Ironers, he predicted, will be a profitable item.

Even quotas

Announcing a new deluxe Shavemaster electric shaver, of which samples are now being distributed to dealers, C.L. Moore, Sunbeam Corp., declared that it would replace all previous models. It has a wider arc, giving a larger shaving head, a new high powered motor of six times the speed of previous shavers. Gift certificates are being furnished dealers for order taking. Other Sunbeam appliance production is still short of goals due to shortages.

New shaver

International Harvester may soon come forth with a home refrigerator. L. J. Smith, assistant branch manager for the general line, in Los Angeles said the company has a $20 million factory ready to produce.

Plows to refrigerators

Eric Johnston's Spokane manufacturing plant, Columbia Electric, has been franchised to produce the Infra-lectric glass-and-aluminum-grid glowless electric house heater. Walter Toly, manager of the plant, showed first samples recently.

Glass heat

85% of all sewing machines are obsolete, said Peterson of New Home, which means a fine market for dealers as soon as machines can be produced. Shortage of trained labor is the biggest difficulty now.

Sew!

"Shorty" Sherman, of Sherman-Swenson, said deliveries on Deepfreeze are now much better.

Better

U.S. Grant III, whose U. S. Grant Supply Co. distributes Federal radio, announced that Federal expects to have an automobile telephone set that dealers will be able to sell, sometime soon.

Auto 'phones

Cal-Lite Inc. said C. V. Childs of Incandescent Supply Co., has a new plant in Hawthorne, Calif., and will soon be producing fluorescent fixtures there.

New factory

Incandescent Supply, according to Marvin Jankelson, will open a new branch house in Fresno about February, at Kern and N. It will have 75 x 150 area, of which 40 ft. frontage will go to showroom and office. John Helms will have charge.

New branch

When Bonneville Power Administration brings the national REA convention to Spokane next April, a big electrical appliance show is planned in connection with it. Dates are Apr. 22-25.

REA show

Ward R. Shafer, Hotpoint executive who was out on the coast for a short while, has left to become general sales manager of Ideal Industries Inc., makers of industrial electrical gadgets.

Change

Because the City Light of Seattle is continuing to sell electric ranges and water heaters, Puget Sound Power & Light Co. has announced it will do so in the Seattle metropolitan area also.

Compete

Organization of a radio and appliance club for social, athletic and similar functions is being proposed in Vancouver, B.C. Its purpose is to develop friendship and team spirit in the industry through the medium of tournaments, games and social events.

Social club

California Electric Supply Co., San Francisco, has the Baby Bear line of automatic stainless steel water heaters made by Vacuum Can Co. of Chicago. Come in 3, 5 and 7 gal. sizes, operate on 110 volt AC.

Baby tank

Emeryville plant of Westinghouse is in production now on the 1,250-watt portable electric heater and deliveries are being made to dealers in Pacific Coast states first, particularly Washington and Oregon, Stuart Forsyth, manager of home heating section, declared. Aluminum, satin finished, Underwriters' approved, with Wesix heating chimney, it weighs 5½ lb., is 15 in. high, operates on 110-volt current.

New heater

WATCH UNIVERSAL'S '47 TRADE ADVERTISING for convincing proof of

LEADERSHIP THAT BUILDS YOUR DEALERSHIP

NOT JUST AN OVEN BUT A NEW AND UNIQUE ELECTRIC COOKING DEVICE!
STARTLING NEW AUTOMATIC COOKING METHODS!
SENSATIONALLY DIFFERENT WITH EXCLUSIVE FEATURES!
BEAUTIFULLY DESIGNED WITH MANY EXCLUSIVE FEATURES!
BIGGEST Wringer WASHER ADVANCE in a DECADE!

DURING the past several years, Universal has stressed "Leadership to Build Your Dealership." '47 is the year when product-wise, convincing proof will demonstrate this leadership! A stupendous Universal Product Parade is about to start down the shopping streets of America. Stops are scheduled at every Universal dealer's. Beautiful, new appliances and housewares crowned with the finest features will draw crowds of enthusiastic customers.

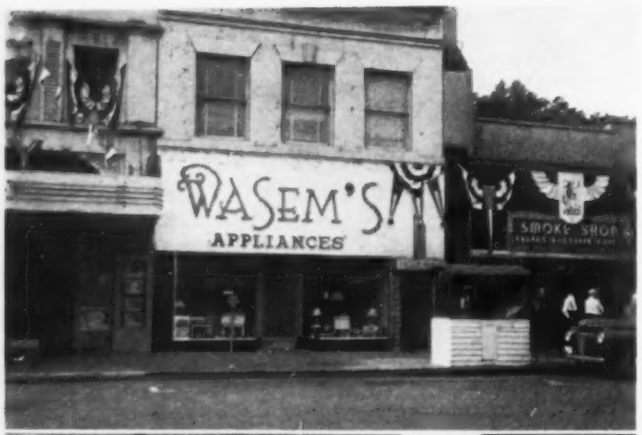
Watch your leading trade papers for the Universal Product Parade. Don't let it pass you by! Board the Universal "brandwagon" for the biggest show of all. The parade starts in January...a new product every month!

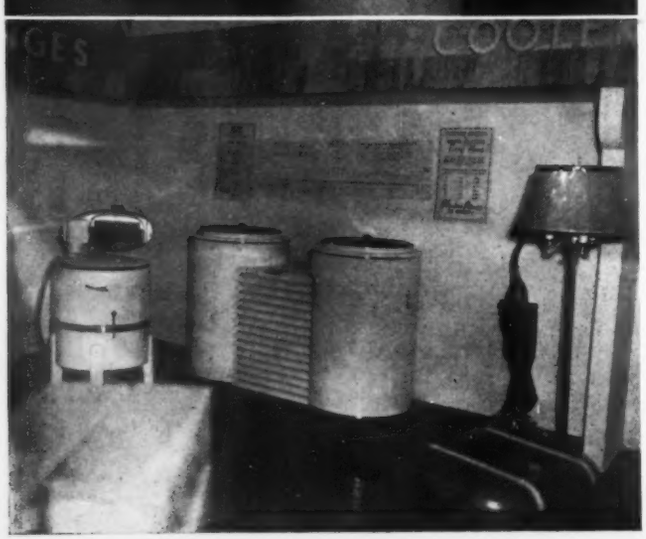
Watch for the **UNIVERSAL** *Product Parade*

UNIVERSAL

LANDERS, FRARY & CLARK • NEW BRITAIN, CONN.

Universal Electrical Appliances distributed in Canada exclusively by Northern Electric Co., Ltd.





Dressed for Selling

Lewiston dealer applies modern display ideas to interior design anticipating appliances

IT seemed like a good idea a year ago to be all dressed up and ready to go places in appliance merchandising. So Weldon B. Wasem of Lewiston, Idaho, re-entered business then with a new store at 710 Main St. And although the merchandise he expected has been slow to come, he has managed to do a good business in giftwares, lamps and shades and such appliances as were available and he still is ready and waiting for the business that is coming.

For 21 years Wasem operated a drug store in Lewiston. In 1941 he added a full line of electrical appliances and employed several outside salesmen. In 1942 he sold the drug business and when the appliances gave out, he went to farming to produce food for freedom. Early in 1945 he decided to re-enter the appliance business, selected a store next door to the theater where traffic was heavy, remodeled it and opened last September.

It contains many modern display and merchandising ideas. A 25x125-ft. space, with full basement for storage, the left front has been arranged for small appliance display with attractive glass shelving under the continuation of the cold cathode lighted canopy that goes around the store. This canopy is finished in birch panels, as are the bookkeeping office and store displays. In a light tone, with harmonizing light-colored walls, it gives a clean modern appearance. Down the center of the ceiling runs a six-tube cold cathode ceiling fixture in a continuous row, giving about 40-ft. candles in the store area.

For the major appliances that are to come, a raised platform is provided around the entire floor area, under the canopy with its concealed lighting. Names of appliances are placed on the canopy front.

In the pictures alongside, the top one shows the new front, a large neon sign, the large windows. A view toward the rear of the store is next shown. Note the canopies and platforms for major appliance display at the rear. Next is shown the sparkling small appliance and giftwares counter. At the bottom is a closer view of the arrangement for the major appliances, with the Washington Water Power Co. rate charts mounted on the wall where a range will be someday.

Lines carried by Wasem include Electromaster ranges and water heaters, Deepfreeze lockers, Dexter washers, Coolerator refrigerators, Beal walk-in boxes, Crosley, Stromberg-Carlson and Farnsworth radios and Universal table appliances. Mrs. Florence Miller, who has been with the business for many years, handles the store and the bookkeeping. Wasem attends to the buying and outside contacts. He intends to have a field sales force again when appliances are in sufficient quantity to make this type of selling feasible.

Lewiston and Clarkston, two growing cities on each side of the confluence of the Snake and Clearwater rivers on the border between Washington and Idaho, are shopping centers for a large agricultural region as well as the large lumber mill located there. New residential districts being opened have already created a heavy demand for electric kitchens and appliances. All electrical dealers in the two cities were very active prior to the war.

Modern Lewiston, Idaho, store which manages to look well stocked despite the scarcity of appliances at present time

Building for the Future!

12 leading women's magazines carry Railley advertising on *Pin-It-Up and Table Lamps

Railley's current advertising campaign in *all* the leading women's magazines—unprecedented in the field of portable lighting—reflects the character of a quality line of lamps which give 159% more light spread...2/3 more light intensity...wider angle lighting. With messages slanted toward a vast audience of women readers, these Railley advertisements are designed with a long-range view...not only to interest your customers today when lamps are easy to sell, but to build good will and brand recognition for the months and years to come.

SOON YOUR CUSTOMERS WILL BE ASKING FOR LAMPS THAT BEAR THIS TAG

Every one of our magazine ads features the striking new string-tags that identify Railley lamps on your sales floor ...constant reminders to almost *thirty million* readers that the lamps bearing these tags are the Railley lamps they saw advertised, and will demand.

Railley
CORPORATION · CLEVELAND, OHIO
ORIGINATORS OF THE
PIN-IT-UP LAMP
TRADE MARK REG U S PAT OFF

RAILLEY CORPORATION • CLEVELAND 8, OHIO

"General Staff" Reviews Plan

Various programs to make more sales for everyone appraised and exchanged by league managers

WHEN a salesman sells an electric range he creates business for everyone in the entire electrical industry. When a bottleneck remains unbroken because of a shortage of some electrical item "the hell it raises races through the entire industry." The utility loses power consumption. The manufacturer loses production. The wholesaler loses billings. The dealer loses sales. The contractor loses jobs. Labor loses hours of work, and the public loses most of all—a modern standard of living.

Such was the theme of the eleventh annual conference of the International Assn. of Electrical Leagues, held in New York City, October 2-4 and over which Victor W. Hartley, managing director, Pacific Coast Electrical Assn., presided, N. J. MacDonald, vice-president, Thomas & Betts Co., set the philosophy of the entire meeting with his simple explanation of *Electrical Interdependence.*

This philosophy was echoed in various phases and by representatives of the various branches of the industry during the first day's session. It was a familiar philosophy to the West for it enunciated in new words the "intelligent self-interest" doctrine spoken by A. Emery Wishon in the 1920's and the all-electric home program championed by Harry Harper of Graybar Electric prior to the war. MacDonald has been heard in the same message in several places in the West recently, including the NEWA Pacific convention and the Los Angeles Electric Club.

Hartley, in his keynote address, compared the purpose of electrical leagues to those of the United Nations council and regretted that leagues had been more successful in their efforts than the United Nations in fostering a spirit of cooperation. He touched upon some of the competitions faced by the industry, namely, liquified petroleum gas, and stressed the need to reinspire electrical industry people in the selling viewpoint. He ended with a strong plea that something be done about the problem of installation costs on electrical equipment. This, he felt, was a problem for no single branch but for the entire industry and that unless solved might condemn electrical products to a luxury class.

The league managers in attendance from the West, besides Hartley, included J. Clark Chamberlain, secretary-manager, Bureau of Radio and Electrical Appliances of San Diego County, who was re-elected a director; Ralph Hubbard, manager, Rocky Mountain Electric League, Denver, also elected a director; Arthur J. Reynolds, manager, Intermountain Electrical Assn., Salt Lake City; and William Quinn, manager, Southern California Radio and Electrical Appliance Assn. Chamberlain is the district governor for the Pacific Coast and Hartley remains on the board as past president.

Other subjects on the program of particular interest to the West were briefly reported as follows:

Kenneth Cook, American Central Manufacturing Corp., discussed training of people to design and sell complete kitchens through the use of plastic models.

H. M. Kelley, Frigidaire, discussed the excess number of dealers and the false interpretations many have made as to the potential market for appliances.

S. W. Andrews, American Gas and Electric Service Corp., in telling of the heat pump, referred often to the only experience so far had in this country, that in the Western states.

H. H. Green, General Electric Lamp Co., told of lighting possibilities in the commercial market. His talk was similar to that presented at the PCEA convention in June.

C. C. Stainback, Westinghouse Electric Corp., showed many new applications in industrial equipment. His paper was presented at the Fresno fall conference of PCEA, early in December.

A. B. Rodner, television specialist with Commonwealth Edison Co., gave startling figures as to the magnitude of the market which Commonwealth Edison Co. estimates will come from television. Surveys indicated that 28% of the people interviewed declared they were going to buy television receivers as one of their first purchases. The Chicago utility estimates there will be 174,000 sets in operation in its territory by January 1, 1948. Another startling figure was that it will take five times the total productive capacity of the entire movie industry to provide television with programs over the whole country. The FCC estimates there will be 150 television stations in the U. S. by the end of 1947. Manufacturers are getting ready to pour these sets into the market as fast as stations are set up.

In the business session, where league managers take down their hair, the longest discussion was that on range installation costs. Many reported some degree of subsidization and that some utilities even offer premiums to builders who put in range wiring. It was argued, however, that this is not selling adequate wiring but buying it.

Another subject which occupied much attention was the need for sales training programs and the league managers discussed the merits of the various courses available and the question of policy regarding charging for a sales course.

Certified Lamps

Certified floor and table lamps, under a plan similar to that for the IES lamps prior to the war, will soon be on the market again. This message can be deduced from the progress reported by William F. Little, manager of Electric Testing Laboratories of New York, who visited California early last month to discuss the certification program with Western lamp manufacturers.

The Certified Lamp Manufacturers will be a voluntary group, unincorporated, which adopts the standards as developed by the Illuminating Engineering Society in manufacturing any or all of eight models of floor, table, end table, and boudoir lamps and which contributes to the national advertising and publicity program that will be carried on. Financing will be done by sale of a tag to certify the lamps made according to the standards and tested by ETL.

Some 40 manufacturers already have joined the group, Little said. In Los Angeles he held a meeting with 17 local manufacturers who showed keen interest in the program. It is felt that utility advertising will also stress the desirability of employing the certified lamps for home lighting.

● THE APPLIANCE repair department of B. C. Electric is closing out in the immediate future as a result of the recently announced decision of the company to withdraw entirely from the appliance merchandising field in British Columbia. The dealer development division of the company is urging dealers to arrange for appliance servicing and has appointed Philip Donald appliance repair consultant.

Monarch's ELECTRIC 2-OVEN ROASTER RANGE MAKES A PERFECT "Steam Table Server"

1. After the meat is roasted and ready to serve, remove it from the "Deep-Heet" oven onto a platter.

2. The black porcelain inset is then taken out of the roaster oven and the white cover replaced in an inverted position to serve as a carving tray.

3. Next, the roast is set on the white porcelain tray where the desired number of servings can be conveniently carved.

4. While the meal is in progress, the roast is covered with the large black inset and kept warm and juicy under low temperature — ALWAYS READY FOR DELICIOUS SERVINGS.

Add the convenience of this "Steam Server" to the many cooking and baking conveniences of the "Deep-Heet" surface oven . . . the "Deep-Heet" electric sauce pan . . . the over-size bake oven . . . and you have an exclusive electric range story that gives you total relief from any concern about "future competition."

Write for a copy of "Notes from the Monarch Reporter" demonstrating the versatility of this exclusive Monarch cooking convenience.

MALLEABLE IRON RANGE COMPANY

3926 Lake St., Beaver Dam, Wis.

If it's a Roaster Range it's a Monarch

RANGES AND HEATERS

Monarch-Paramount

COAL, WOOD, ELECTRIC, GAS and COMBINATION RANGES

Camera Caught

Dummy and not so dumb! When the merchants of Burlingame, Calif., staged a fiesta, Clare Kemp, whose appliance store was in the very center of things, stopped the crowds with this daring electric blanket window. Oscar the dummy, with extra blanket and hot water bottle, was contrast to the attractive live miss under the light electric blanket. The new G-E radio alarm was featured at the same time

Edwina Nolan of Bendix Home Laundry Institute and Evelyn Cheleski, home service director of Larson Distributing Co., Denver, put on a laundry forum for crowds of women at the May Co. store last summer. It was the first such forum by a department store

R. A. Hill, Arizona Wholesale Supply Co., Phoenix; Don Larnach, G-E Supply Corp., San Francisco; W. K. White, G-E Supply, Los Angeles, and H. E. Stokes, product specialist from General Electric, Bridgeport, who addressed a San Francisco meeting for Western G-E service managers of all distributions for the full line (below)

Lou Bildstein, president of Maytag Rocky Mountain Co., took his service and sales managers and five regional managers from Colorado Springs and surrounding areas to the Maytag plant at Newton, Iowa, to see how what they sell is made and what more is to come

FOR HARD-TO-GET NUMBERS

See Your Virden Distributor

On residential lighting, it pays to ask Virden! For you know you can depend on Virden quality, lighting and value. And you can also be sure of units that are charmingly styled, pleasingly decorative . . . to fit any home need. Shown are a few items that indicate the range of Virden's line. You'll find many more at your Virden distributor—and you'll find him ready to serve you.

John C. Virden Company • Cleveland, Ohio

Member American Home Lighting Institute

THIRTY YEARS OF PIONEERING IN ELECTRIC WATER HEATING

Pioneering a new industry is not an easy task. New trails must be broken, prejudices overcome and principles proved by the acid test of experience. The Clark stands first in electric water heating today because the principles it pioneered thirty years ago have stood up under toughest service in all kinds of waters.

That we are constantly striving to build into Clark even better performance and longer life is evidenced by the latest development to come out of the Clark research laboratories — Ionodic protection against corrosion. Tank life more nearly approaching that of the Clark element is assured, even in highly corrosive waters. The coming years will certify that in pioneering this improvement Clark has once again proved its leadership in electric water heating.

McGRAW ELECTRIC COMPANY
CLARK WATER HEATER DIVISION
5201 W. 65th STREET, CHICAGO 38

CLARK
ELECTRIC WATER HEATERS
A Toastmaster Product

APPLIANCES
and accessories

Electric Comforter (1241)

An electric comforter has been added to the Westinghouse line. It is double-bed size, comes in rose, blue and green; a thermostat maintains a constant preselected temperature, regardless of changes in room temperature.

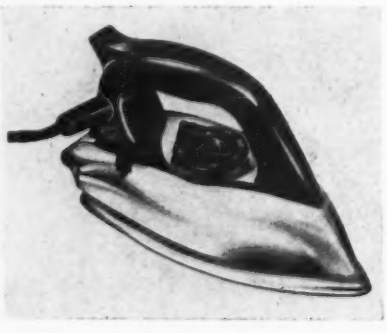
The 150-watt heating element is stitched to an inside warming sheet by the technique used for the Army's electrically heated flying suits. The rayon satin covering has a slip-proof finish on the underside; a 36-in. zipper in the end allows easy disassembly for cleaning.

The thermostat control is in the shape of an ornamental powder box and is said to take up little more room on a bedside table than a package of cigarettes. Switch for the control box is a pull type, with a red visual indicator for the "on" position. When the switch is on, a small neon light gives a soft, diffused glow.

Four protective thermostats attached to the warming sheet are of a bimetal strip type and the comforter has flame-proof cotton filler. Warming sheet is of preshrunk cotton muslin; heating element wires are of special cadmium bronze alloy, helically wound for flexibility and insulated with a special plastic.

Automatic Iron (1242)

The new Century Glide-O-Matic electric iron is fully automatic, with temperature control selector, features a special hard aluminum alloy sole plate, weighs 3½ lb. The thermostat is of the automatic conduction type. A permanently attached cord is side-mounted for greater convenience. Operates on 1,000 watts a-c, has Underwriters' approval.



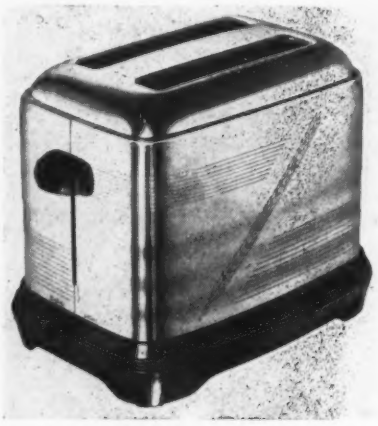
Wall Ventilator (1243)

A built-in wall ventilator with white plastic grille is being offered by the American Blower Co. under the name Aeropel. The 12 x 12-in. grille is made of American Cyanamid's Beetle plastic by Michigan Molded Products. The ventilator has a rated capacity of 400 c.f.m. A three-blade propeller type fan is driven by an enclosed constant-speed motor.

Ironer (1244)

Two-position shoe, safety release bar, dual thermostatic controls are features of the new Bendix ironer, claimed by the manufacturer to combine the best features of the rotary and flatplate types. The right knee control is adjustable; ironer height may be regulated; the bakelite forming board may be raised or lowered. The roll has three usable open ends; table top is unobstructed under and behind the roll. The panel board has lighted switches for motor and heat controls and a fingertip control button for manual operation. The ironing shoe has two speeds, push-button controlled; heating elements are divided into two parts and are controlled by separate switches placed near each end of the forming board. Scheduled to be on the market soon, the ironer will be available in two models, deluxe and standard.

Pop-Up Toaster (1245)



The "Color Guard," a bimetal strip activated by bread temperature, is a feature of the new Proctor automatic pop-up toaster, Model 466. With this thermostat the operator presets for color, not time, thus compensating for age or moisture content of bread. According to the manufacturer, cold toast can be reheated to its original temperature without burning. Other features of this toaster are: a crumb tray which snaps off and on, manual control when desired.

Shaver (1246)

With its new Collman "58," the Collman Mfg. Corp. has entered the electric shaver field. This shaver has a patented combing teeth action, claimed to guide the whiskers into the cutting slots. The designation "58" comes from the 58 combing teeth, matched by 58 cutting slots and 58 cutting teeth. Other features listed by the manufacturer are a positive button starter; 4-pole motor; offset body design for better vision. The shaver operates on a-c and d-c.

Electric Metronome (1247)

An electric metronome, product of the Crystal Research Laboratories Inc., is being distributed by G. Schirmer Inc. This device is operated by a thyraton tube and the announcement claims that it sounds the beat in synchronization with a flash beat; has volume and tone control; operates in any position; permits tempo dialing.

Small Washer (1248)

A Handyhot portable electric washer with stainless steel tub has been introduced by Chicago Electric Mfg. Co. This model, XL-5,

has a 3-blade aluminum agitator, which oscillates 84 times per minute; overflow capacity of 7 gal.; clothes capacity of 3 lb. dry weight. A patented feature permits removal of the cover without lifting the agitator. A 7½-in. wringer with pressure control may be attached to the washer tub. The wringer is of bonderized steel coated with white baked enamel.

Iron (1249)

Chicago Electric Mfg. Co. has announced production of the Handyhot automatic iron, Model 1501-H. This model has a thermostatic knob for temperature control, with fabric markings; cast aluminum sole plate; beveled edges; broad heel rest; black plastic handle. It is rated 1,000 watts, 115 volts, a-c; weighs three pounds.

Travel Iron (1250)

The Handyhot folding iron, Model 1203-H, weighs two pounds, has full household size beveled sole plate, 6-ft. detachable cord; is rated 400 watts, 15 volts, a-c and d-c. A fabric carrying case is furnished.

Toaster (1251)

Another new Handyhot appliance is a turn-over type toaster, Model 509-H, in chrome with black handles and side rails. Bread turns over when spring tension doors are fully open. This toaster is rated 400 watts, 115 volts, a-c or d-c.

Warning Device (1252)

Pilotron Co. of America is in production with a warning device for electric appliances. It comes complete in cord sets or may be attached to equipment; signals bright on high heat, dim on low, indicates overload. Available in sizes up to 250 watts and in 300, 400, 500, 750, 850, 1,000 and 1,250 watts; operates on a-c and d-c, 250 or 125 volts.

Time Switch (1253)

Robot portable time switch, manufactured by the Miller-Harris Instrument Co., will turn electric lights or appliances on and off automatically on a 24-hour cycle. The control is plugged into a wall socket, the appliance into the control. The device is 3 x 5 in.; is in a metal and plastic case.

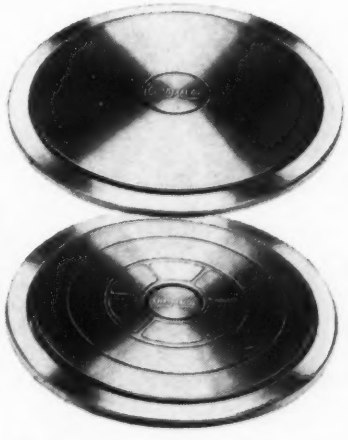
Trouser Creaser (1254)

An electric trouser-creaser has been announced by the Empire Appliance Co., which states that the 10-oz. unit can be used also for ties, slacks, etc. The hinged blades can be opened to insert garments.

Chromy says:

"Large or Small, They fit All!"

For Replacement on all Electric Ranges



For extra profits stock Chromalox Superspeed and Heatflo Units

With CHROMALOX *Triangular* Units, *two stock sizes* are all you need to service any range. CHROMALOX Adaptor Rings give perfect fit and fast, easy installation! A screwdriver is your only tool . . . and time saved on the job means more profit per sale.

Housewives prefer the fast, easy-to-clean and economical features of the CHROMALOX design. Longer life, too, for CHROMALOX *Triangulars* are made with INCONEL, the finest heat-resisting alloy known.

Investigate this fast-selling CHROMALOX Range Unit Replacement line today. Write for Bulletins CF-145 and L-1023A.

On new ranges and for replacement

CHROMALOX

means *Electric* Cooking at its Best!

RC-19

EDWIN L. WIEGAND COMPANY • 7540 THOMAS BOULEVARD • PITTSBURGH 8, PA.

CHOP OFF YOUR LOAD PEAKS

with

Control Corporation's New Electric Hot Water Heater Control

(For Wye Systems)

- **Automatically turns water heaters on or off in accordance with load peaks.**
- **Low cost transmitter.**
- **Operates over power Circuits.**
- **Not affected by distance.**
- **Low power requirements.**
- **Can be used for Street Lights.**
- **Can be used for House Heating Loads.**
- **Can operate at any time, day or night.**

For details write or wire

CONTROL CORPORATION

718 Central Avenue

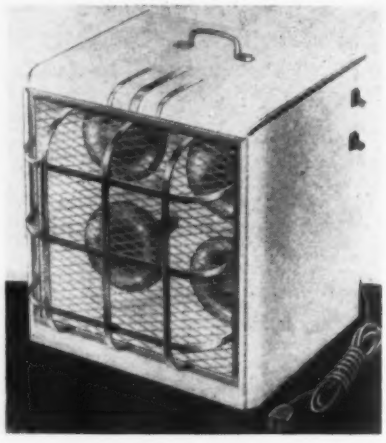
Minneapolis 14, Minnesota

Vacuum Cleaner (1255)

The new Hoover deluxe model embodies the company's patented air-cushion vibration and the Hygienisac, zipper-closed outer bag, disposable inner bag; has other features of previous models. Kit for the cleaning tools has been redesigned for greater convenience in use and storage. Color is brown; unit is designated as Model 61.

Infrared Heater (1256)

Duro Test Corp. has designed a portable heater using removable infrared lamps. This heater goes under the trademarked name, "Ray Diator"; is equipped with four 250-watt natural ruby infrared lamps, a 10-ft.



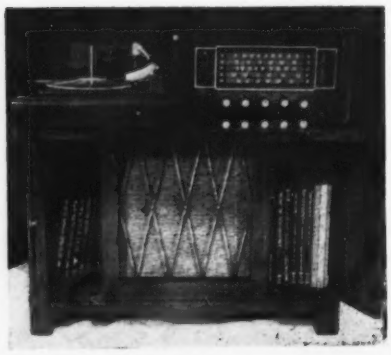
cord, two control switches, for 500 or 1,000 watts. It comes in four colors: ivory, coral, tropical green and walnut.

Combination Unit (1257)

Television, FM, AM and a record player will be combined in a single instrument designed by General Electric for the home entertainment field and scheduled for production next year. The machine will be equipped with a 10-in. picture tube, permitting a picture of approximately 8x6 in. It will be possible to tune in all 13 television channels without service work, the announcement states.

FM-AM Receivers (1258)

General Electric has added a line of FM-AM receivers, designed for FM reception on both the low and high frequencies. They are equipped with a new tuning system which makes use of silver-plated variable inductances, claimed to surpass the efficiency of gang condensers. Both models have the electronic reproducer designed to

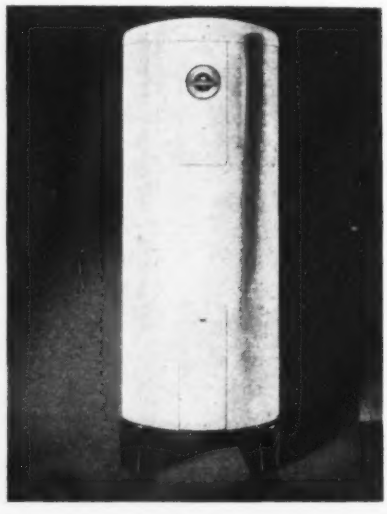


produce recorded music with virtually no scratch. Model 417 has ten tubes and a 12-in. Alnico loudspeaker; five tuning bands, one for AM, one for each of the low and high FM frequencies and two for short-wave reception. Model 502 has 14 tubes, a 12-in. Alnico 5 loudspeaker and a "squelch circuit." Tuning band arrangement is identical with Model 417.

Other recent additions to the G-E line are: a table model radio-phonograph, with the newly developed "foolproof" record changer; a portable and de luxe table model phonograph with electronic reproducer.

Water Heaters (1259)

Glass-lined electric water heaters are being manufactured by Frigidaire for installation in soft-water areas. Production at present is limited to four models, 30- and 50-gal. sizes, with either one or two heating units. Units are immersed, heating the water by direct contact. All models are thermostatically controlled, operate automatically and are insulated with approximately 3-in. of spun-glass wool, the announcement states.



ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

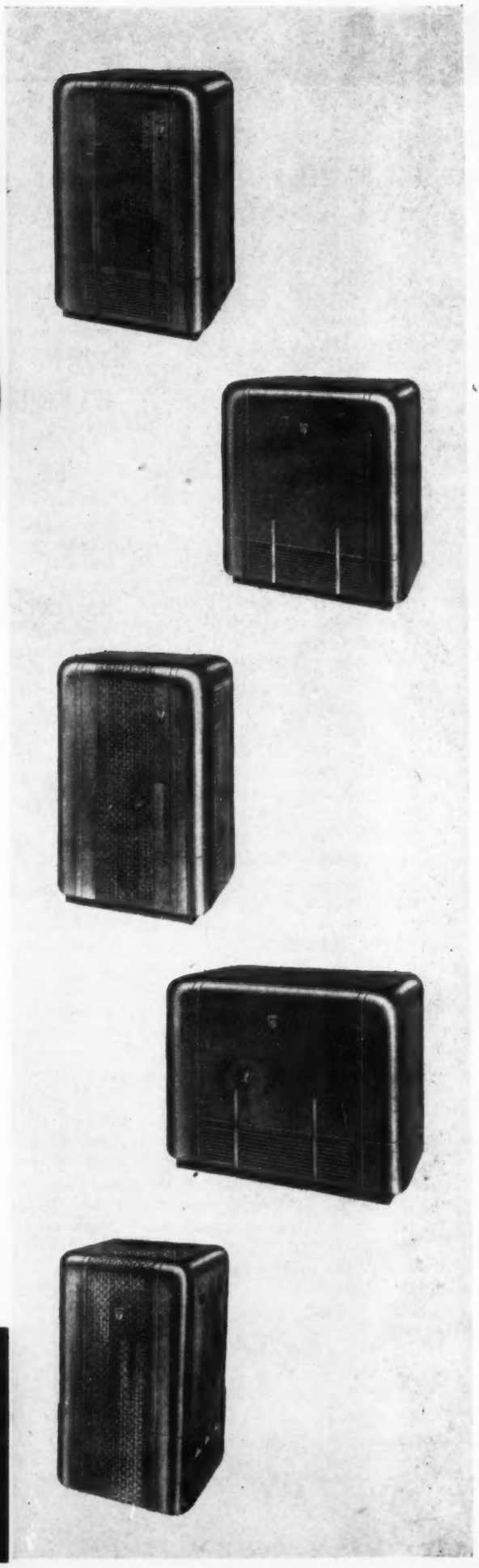
1241	1242	1243	1244	1245	1246	1247	1248
1249	1250	1251	1252	1253	1254	1255	1256
1257	1258	1259					

Name..... Company*..... Title*.....

Address.....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

YOUR OWN CUSTOMERS HAD A HAND IN *Silent Sioux* DESIGN



Credit where credit is due. And credit for many of the new improvements in this Silent Sioux line must go to your customers. Yes, your own customers had a hand in Silent Sioux design. Their suggestions, their ideas in what they need in oil burner heating, all have been incorporated with many other new features to give greater safety, comfort and convenience. Tailor-made to your customers' needs and today's new market . . . no wonder the demand for Silent Sioux is so great.

Complete illustrations and all specifications are available in our portfolio, so write today for your free copy and see for yourself the many advantages of his new, and what promises to become one of America's fastest selling lines.

SILENT SIOUX OIL BURNER CORPORATION, ORANGE CITY, IOWA

Silent Sioux

PIONEERS IN GOOD HEATING

NEWS of the industry

ARIZONA GROUP STUDIES BOULDER POWER RATES

Maintaining that Boulder power rates proposed by the Arizona Power Authority are too high by $1,000,000, major utilities of the state (including private companies, the Salt River Valley Water Users Assn. and the San Carlos Project) have formed an Electric Coordinating Committee.

Members are J. R. Snider, Tucson Gas, Electric Light & Power Co.; C. H. Reed, San Carlos Project; Henry B. Sargent, Central Arizona Light & Power Co.; Philip B. Shaw, Arizona Edison Co.; Malcolm M. Bridgewater, Arizona Power Co.; H. J. Lawson, Salt River Valley Water Users Assn.

Lin B. Orme, president of the water users association, stated that, since Boulder Dam's completion in March 1936, no constructive action has been taken by public agencies toward bringing in Colorado power or water. He added that it was believed that, by contracting for the full amount of Boulder power available to the state, Arizona utilities could have $1,000,000 over the authority's proposed rates, allowing marketing in central Arizona at 3.2 mills per kwh. He pointed out that since his association is a non-profit organization and since utility rates are regulated by the corporation commission, savings would be passed on to electric consumers.

Motives of the group were challenged by the power authority, which termed its claims "extravagant" and stated that the authority has jurisdiction over allocation of power granted to Arizona.

Power Shortage Threat Countered by Chamber

Expressing the belief that the Northwest's present electric power consumption should be a cause for bragging rather than gloom, Arthur L. Fields, Portland Chamber of Commerce industries committee chairman, recently took steps to counteract what he termed "inadvertent effects" of Bonneville's warnings of power shortage.

He explained that the chamber's eastern contact engineer is being questioned about shortage reports by concerns considering locating in the area.

"I don't think it is necessary to paint any gloomy picture of 'power shortage' in order to get Congress to appropriate funds for additional generators on the Columbia," he added. "The tremendous growth in use of power in the region speaks for itself, and I believe we'll get further by telling a constructive, hopeful story than by acting scared."

Power company officials stated that they expected no great power deficit in the area this winter; that they had faith in the ability of their steam plants to handle peak loads even greater than estimated.

Washington Voters Give "No" Vote on 166

Initiative 166, requiring PUD commissioners to submit proposed electric system purchases to the voters, was defeated in Washington. Defeat of the measure was believed due, in large part, to confusion in the public mind, generated by pre-election campaigning. Yakima County's three-man PUD commission went along with the state-wide citizens committee and most of the private companies in supporting the measure. Puget Sound Power & Light Co. staged a vigorous campaign against the measure, its efforts including newspaper ads signed by President Frank McLaughlin.

Utilities, Contractors Get Equipment Priority

Electric utility companies and electrical contractors may qualify as top priority bidders for power equipment from wartime military installations as a result of a directive issued by the National Housing Agency.

The NHA order called on federal disposal agencies to offer utility equipment, as well as buildings, at such installations for sale intact to the highest bidder who certifies that he will use the materials in connection with veterans housing. These instructions, when put in effect by the disposal agencies, would supersede the former practice of extending priorities on sales of surplus materials of this type to federal bureaus, state and local governments, and non-profit institutions.

NHA officials said that the objective of the order is to speed procurement of surplus property needed for home construction and channel it into the Veterans Housing program. Power, gas and water facilities above and below ground at surplus installations could, under the terms of the order, be sold to utilities or contractors who would reclaim the materials for use in veterans housing, they said.

EIGHT PUD PROPOSITIONS TURNED DOWN IN OREGON

Oregon voters returned an emphatic "No" to all eight PUD propositions on the November ballot. Communities voting were: Baker, Clatsop, Harney, Linn, Malheur, Marion and North Lincoln counties and Junction City. The election marked the fifth PUD try in Linn County, the third in Marion and Clatsop counties, the second in North Lincoln, Malheur and Baker counties.

In a 14-year record of PUDs in the state, the *Oregon Voter* pointed out that 43 elections have been held, resulting in 13 districts, 3 of which survived only briefly. Eight have done little to date except spend about $170,000 of taxpayers money and two have gone into business, the *Voter* reported. Of the ten survivors, the analysis continued, seven have poor operating prospects, one is going into business, one is menaced with collapse, one has had moderate success to date.

Community Asks Right to Withdraw from PUD

Change in the Oregon PUD law to permit an area to vote itself out of a district has been requested by more than 200 electric users in western Lane County, served by the Central Lincoln PUD.

In an appeal to state legislative candidates, signers asked for an amendment "to permit an area like ours to vote itself out of an unsatisfactory and costly PUD set-up and take over the lines now owned by the PUD at their actual value." The appeal went on to explain that the area was induced to annex itself to the PUD "on the promise that we would be supplied with an abundance of cheap Bonneville power," but that "instead of getting more power and better service, things have been getting worse all the time . . . "

● UNDER the recent increased ceiling on flood control expenditures during the fiscal year, work will be carried on at several Western projects involving power facilities. These projects include: Anderson Ranch, Idaho; Boise-Payette, Idaho; Columbia Basin, Wash.; Palisades Dam, Idaho; Rio Grande, N. M. and Tex.; Yakima-Roza Canal, Wash.; Central Valley, Calif.; Davis Dam, Ariz.; Fort Peck Dam (power facilties only), Mont.; Shoshone Dam, Wyo.; Kendrick, Wyo.; Boysen Dam, Wyo.; Colorado-Big Thompson, Colo.

HOW TO USE THE NEW Westinghouse LIGHTING COURSE TO SPEED THE "RELIGHT AMERICA" PROGRAM

TRAINED SALESMEN NEEDED TO SELL LIGHT

Modern lighting requires expert application. Users have been led to expect high standards of quality of lighting, pleasing decorative effects, and ease of maintenance from their lighting installations.

Changes in lighting engineering, improvement of light sources, and additions of new forms such as circlines and slimlines have rendered obsolete much of the previous information on these subjects.

Those who sell lighting are the first who must be educated in the "Relight America" campaign.

TRAINING STARTS WITH THE UTILITY SALESMEN

In any area, the utility company is the largest and most influential organization concerned with the installation of new lighting. It is only natural that the utilities should take the lead in sales training.

That's why the Westinghouse training course, "Illumination...Fundamentals and Application," was developed after asking utilities what they needed and wanted.

The course has received an enthusiastic reception from utilities, with more than 100 leading companies now using it.

TRAINING CONTRACTORS AND JOBBERS

The next logical step in the sales training program is the training of the contractor and jobber salesmen who, like the utility lighting salesmen, are helping to relight America.

TRAINING THEM OFFERS THE UTILITY AN OPPORTUNITY

The contractor and jobber salesmen need training in current lighting techniques. Because of the small size of any one contractor or jobber organization, the individual companies cannot afford to prepare their own training courses or even to buy complete packaged courses such as the one offered by Westinghouse.

Still in the aggregate these individual companies are a vital factor in the "Relight America" program. The standard of their work will seriously affect the result of the whole lighting program.

Several utilities have already spread the use of the Westinghouse training course to include the contractors and jobbers in their area. This is not only a valued service to the contractors and jobbers but an opportunity for the utility:

It helps to insure the success of the lighting program.

It leads to more satisfied users of modern lighting.

It helps to assure correct installation and correct electrical characteristics of new installations.

PLAN AND PROMOTE A TRAINING PROGRAM NOW

Tell the contractors and jobbers in your area about the training material you can place at their disposal. Put on the Westinghouse course as many additional times as necessary to accommodate *all* the lighting salesmen in your area.

If you do not already have the Westinghouse course, call or write your Westinghouse representative, or write direct to Lamp Division, Westinghouse Electric Corp., Bloomfield, N. J. One set of course materials costs $225. For more information about the course ask for "Illumination... Fundamentals and Application," Form A-4909.

Westinghouse
LAMPS FOR SEE-ABILITY

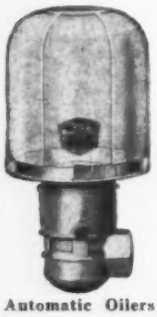
MORE CUSTOMER SATISFACTION
with
TRICO PRODUCTS!

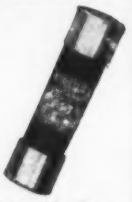
Sound engineering, quality materials and precision workmanship for more than 25 years has resulted in wide-spread preference for TRICO PRODUCTS and guaranteed customer satisfaction!

Use this **proved** line to increase job quality and make more money by installing . . .

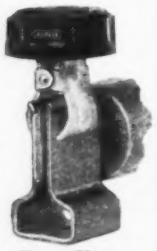
TRICO FUSES—for double protection and triple service.
KLIPLOK CLAMPS—to supply perfect contact between fuses and clips.
FUSE PULLERS—for safely removing and replacing fuses.
OILERS—for automatic lubrication of bearing surfaces.
AIR GUNS—to increase production, cleaning, etc.

Leakproof Air Guns


Automatic Oilers


Renewable Fuses

Fuse Pullers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Boost your profits—provide years of dependable, trouble-free service—increase customer satisfaction. INSTALL.

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COURT DECISION CLEARS WAY FOR DUPLICATE LINES

Following a superior court decision in its favor, the Walla Walla Electric Cooperative Inc. of Walla Walla, Wash. is seeking REA financing for construction of transmission lines into the College Place area. Approximately 650 would be served and the lines are estimated to cost $110,000.

The court decision upheld issuance of a permit to the co-op to construct and operate a power distribution system. The new lines would duplicate those of Pacific Power & Light Co., and the company and a group of county residents had sought a writ of mandamus.

● CALIFORNIA voters at the November election approved a proposition to change the name of the state Railroad Commission to the Public Utilities Commission. At the same time they made the governor's appointments to the commission subject to veto of the state legislature. Although gubernatorial candidates must now have a majority vote of the state senate, it was pointed out that considerable latitude is still possible on interim appointments (The Commission set-up is on staggered six year terms). Sponsors of the bill claimed it would do away with "deathbed" appointments, since appointees by an outgoing governor would be reviewed by the incoming state senate.

● THE WASHINGTON State Supreme Court, in a hearing scheduled for Jan. 7 at Olympia, will review the decision of the Clark County Superior Court giving Clark County PUD the right to condemn Northwestern Electric and Pacific Power & Light Co. properties. The court granted the hearing on the application of Joseph Hall, attorney for the power companies. All condemnation proceedings have been ordered suspended pending the hearing.

● PACIFIC GAS AND ELECTRIC was ordered by FPC to increase the discharge of water from a diversion dam of its Pit River Hydroelectric project. Acting on complaints by the Interior Department and the California State Fish and Game Division, FPC determined that the flow of water below the Company's Pit 5 was insufficient for the preservation of fish life.

● PACIFIC POWER & Light Co., has completed surveys for a 22,000-volt line from Ione to Heppner in its Sherman County system. The line is part of a $112,000 improvement program scheduled for the Sherman area over a two-year period.

control devices with a FAMILY TREE

All Federal products bear this emblem but that's only the beginning of their family resemblance! You'd have to go back to Federal's engineering department, its laboratories, its far-flung manufacturing divisions—if you'd really want to see how this tree took root. For, though they may differ widely in design and application, all Federal controls have in common the characteristics of built-in quality . . . quality that guarantees performance! . . . Federal Electric Products Company. Executive Offices: 50 Paris St., Newark 5, N. J. Plants: Hartford, Conn., Newark, N. J., St. Louis, Mo., Long Island City, N. Y.

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held by one screw

Stationary and movable contacts in FEDERAL NOARK industrial controls are held by a single screw in most sizes . . . a feature that makes for quick accessibility from the front . . . and another reason why it's good business to specify FEDERAL NOARK.

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INDUSTRIAL CONTROLS

FEDERAL ELECTRIC PRODUCTS COMPANY, MANUFACTURERS OF A COMPLETE LINE OF ELECTRICAL PRODUCTS INCLUDING: MOTOR CONTROLS, SAFETY SWITCHES, CIRCUIT BREAKERS, SERVICE EQUIPMENT, PANELBOARDS AND SWITCHBOARDS

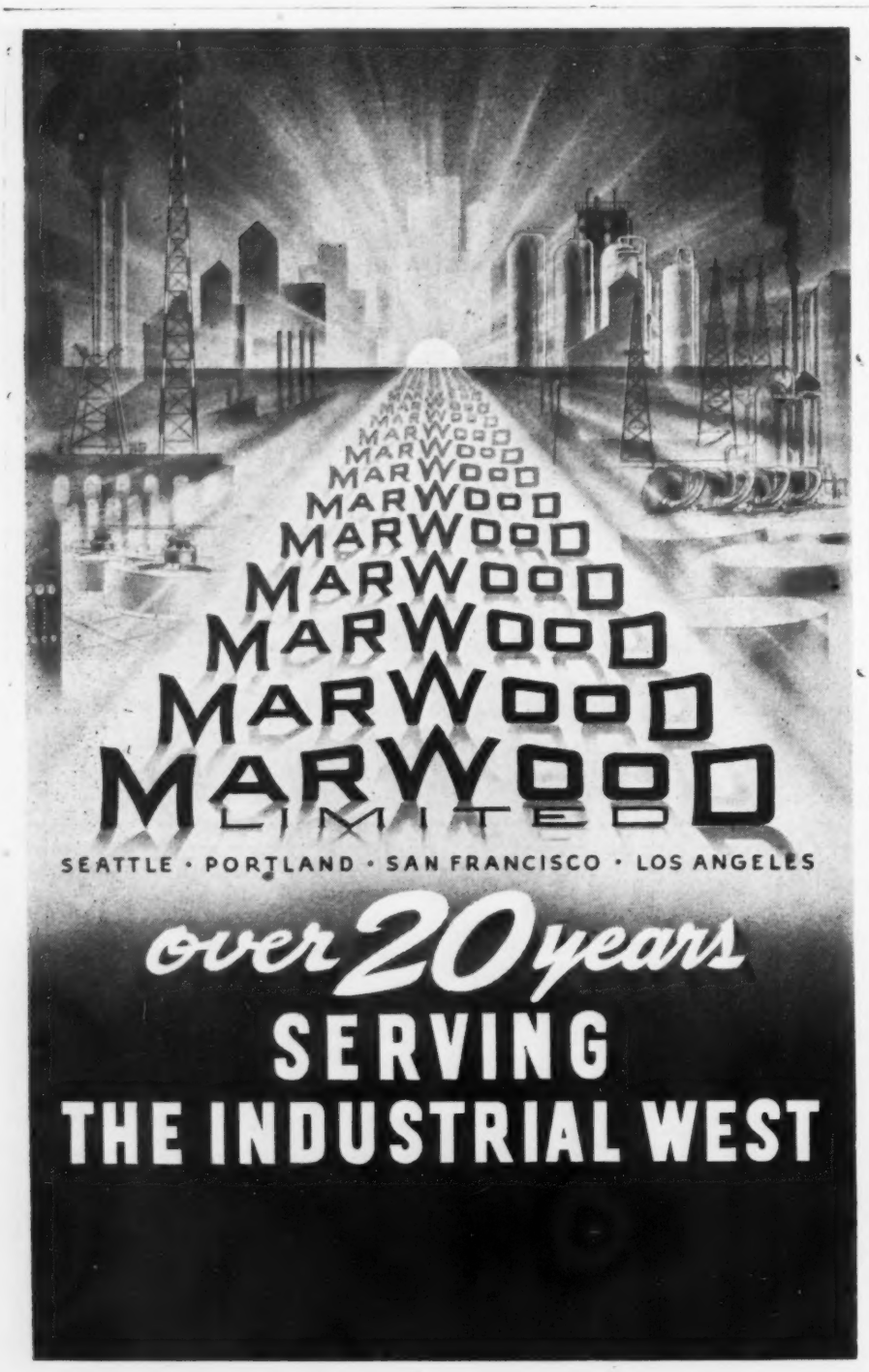
COLORADO COMPANY PLANS STEAM PLANT ADDITION

Public Service Co. of Colorado has announced plans for a $4,000,000 addition to its Denver-Lacombe generating station, following indication by USBR that power from the Big Thompson project would not be available until 1949 or later.

A 35,000-kw. high-pressure steam turbine, boilers and auxiliary equipment will form the major part of the new installation, which will step up the company's central system to 208,000 kw.

Output of the Lacombe plant will supplement power from the company's Valmont plant, near Boulder. Work is now in progress on a 110,000-volt transmission circuit from this source, connecting with the South Denver substation, now under construction at a cost of $460,000.

● SURVEY of Tacoma City Light, indicating its position in view of changed economic conditions, will be made by W. C. Gilman & Co., of New York at a cost of $18,500. The study may prove the basis for a revised light and power schedule, Utilities Commissioner C. A. Erdahl said. Heavy demands for electric heating, which if continued will require costly additions to the city's distribution system, are causing concern, according to Erdahl, who added that the department already is faced with serious difficulties in securing additional equipment. Bids on two sets of orders recently promised delivery in from 19 months to three years. he pointed out.



Bonneville Requests $36,000,000 Budget

A $36,000,000 budget request for Bonneville Power Administration has been placed before the bureau of the budget in Washington, D. C., by Administrator Paul J. Raver. The request includes $31,250,000 for transmission lines, keyed, Raver said, to installation of new generators at Grand Coulee, completion of McNary Dam in 1952 and availability by 1950 of 2,000,000 acre-ft. of upstream storage at Hungry Horse Dam in Montana. An operation and maintenance item of $5,000,000 is included in the budget.

● FARM WIRING is the title of a six-page booklet which has just been issued by the agriculture division of the B. C. Electric Railway Co. Ltd. The bulletin presents a valuable collection of information on the rural uses of electricity. A typical wiring plan for a farm, and also a wiring plan for a farm house are two features of this bulletin. Details of services available to farmers and their wives through the agriculture department, and the home service department of the company are outlined.

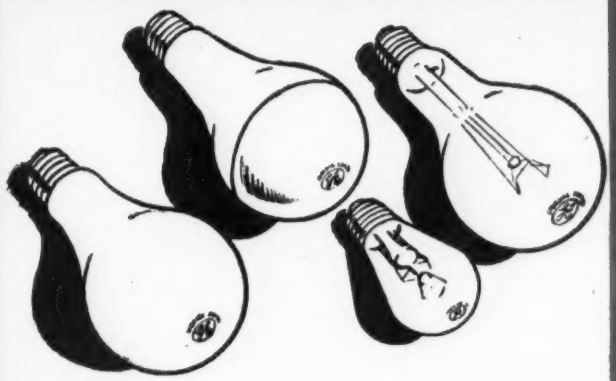
● RURAL and Village Electrification is the subject of a recent published report of the Columbia Basin Joint Investigations. It was prepared by George A. Fleming, USBR; Daniel W. Teare, REA; Warren H. Marple, BPA; L. J. Smith, State College of Washington; is available under the title, *Columbia Basin Joint Investigations Rural and Village Electrification, Problem 23,* from the Superintendent of Documents, Washington 25, D. C., at 25 cents.

● BY A VOTE of members, Pend Oreille Rural Electric Cooperative of Newport, Wash., has postponed sale of its properties to the Pend Oreille County PUD for at least one year. Organized six years ago, the co-op serves about 500.

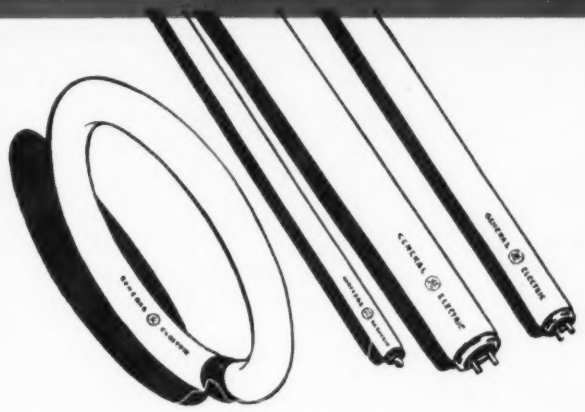
● TO PROVIDE a second power source for Grays Harbor, Wash., Bonneville will construct a 115,000-volt line between Olympia and Cosmopolis, it was announced recently. The line will cost about $1,065,000.

Whatever lamps you need

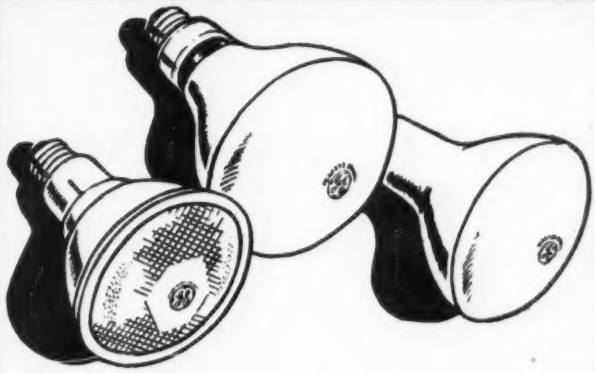
G-E MAKES 'EM ALL



G-E Filament Lamps for general lighting jobs are made in sizes from 6 to 1500 watts; candelabra, intermediate, medium or mogul screw bases, or bi-post base in certain sizes. Standard lamps operate on 115, 120 and 125 volt circuits. Others made for 230 and 250 volt circuits and for low-voltage farm service.

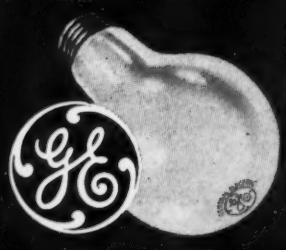


Complete Fluorescent Line includes standard lamps from 14 to 100 watts in white and colors. The G-E Slimline ranges from 42″ to 96″ in length, ¾ to 1 inch in diameter; instant-starting, with single-pin base. G-E Circline is now made in 12″ diameter; will soon be available in 8¼″ and 16″ sizes.



G-E Reflector and Projector Lamps offer a wide selection of concentrated and wide-spread floodlighting beams. Reflector spot lamps are widely used to highlight store displays. Reflector flood lamps are ideal for overall emphasis lighting. Both serve similarly in outdoor uses, such as safety lighting in plant yards.

G-E LAMPS



Stay Brighter Longer!

GENERAL ELECTRIC

No Lighting Job can be better than its lamps. You can depend on the quality of G-E lamps for every use — home, commercial and industrial. Whatever your interest in lighting, look to General Electric for the most advanced developments in lamps, because G-E Lamp research is constantly at work with one idea in mind—to make G-E lamps *Stay Brighter Longer!*

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EVERSTICK ANCHORS...

FOR SPEED IN INSTALLATION

The exclusive Everstick nut housing locks the Anchor firmly on the rod. This speeds up installation. Plates are so designed, that they expand easily into undisturbed earth, and extra holding power is achieved. Made of tough, rust-resistant malleable iron. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

ELECTRIC COOPERATIVE TO ACQUIRE CITY SYSTEMS

Two small municipal power systems in eastern Wyoming will be acquired by the Tri-County Electric Assn. Inc. of Sundance with a portion of a recent $855,000 REA loan.

Tri-County, a newly organized cooperative, will pay $35,000 for the 3.5-mi. distribution system and 98-kva. engine-driven power plant of the Sundance Light and Power Department. The co-op also is purchasing the Upton Municipal Light and Water Department's three miles of distribution lines and 150-kva. generating unit for $35,000. Co-op officials said that both generating plants will be scrapped, since arrangements have been made for energy supplies from the steam plant of the Wyodok Coal Co., near Gillette, Wyo.

A 45-mile, 34.5-kv. transmission line will be built from the coal company plant to Sundance, Upton and Osage. This is part of the co-op's $777,500 program of line building, which includes 411.6 mi. of single-phase and three-phase distribution lines, 34 mi. of transmission underbuild, 20.4 mi. of secondary and 4.5 mi. of service lines.

The systems to be acquired served 153 consumers at Sundance (population 685) and 170 at Upton (population 545). The co-op plans to serve 823.

• To COMPLY with a technicality in the sale of northeastern Arizona power property, the Arizona Gorporation Commission has approved the change in the trade name of the White Mountain Cooperative Inc., to the Navopache Electric Inc. The action was taken by the commission so the Navopache utility may complete a purchase of the Lakeside Light & Power Co. When negotiations were started, the Navopache company was doing business as the White Mountain Cooperative. The property is part of the Herbert D. Lore estate.

• UTAH POWER & LIGHT Co. has reached an agreement with Logan, Utah, to supply an "emergency load" whenever the municipal power plant is unable to supply demand. A Diesel engine ordered to ease present overtaxing of the municipal plant cannot be delivered until February or March, city officials said.

• PURCHASE of the Eloy (Ariz.) Light & Power Co. by the Trico Electric Cooperative Inc. is being worked out, subject to REA approval of a financing loan. Proposed purchase price is $200,000.

B. C. ELECTRIC ACCEPTS APPROPRIATION PLAN

No objection will be raised by the B.C. Electric Railway Company Ltd. to expropriation by the British Columbia Power Commission of its assets in the northern Vancouver Island and Kamloops area, according to A. E. Grauer, president of the company.

Pointing out that the expropriated areas are distinctly separate from main B.C. Electric power distribution centers, Grauer said that company officials had studied the situation carefully with commission representatives.

He said that continued operation by the B.C. Electric of the northern Vancouver Island development would probably have meant an additional installation of generating equipment to serve the expanding area. Already, he said, the company had found it necessary to purchase power from neighboring sawmills.

Grauer added that the Kamloops area was similarly divorced from the B.C. Electric's lower mainland system, and that it would be "more economical for the commission to serve the Kamloops district and surrounding areas rather than for the B.C. Electric to do so."

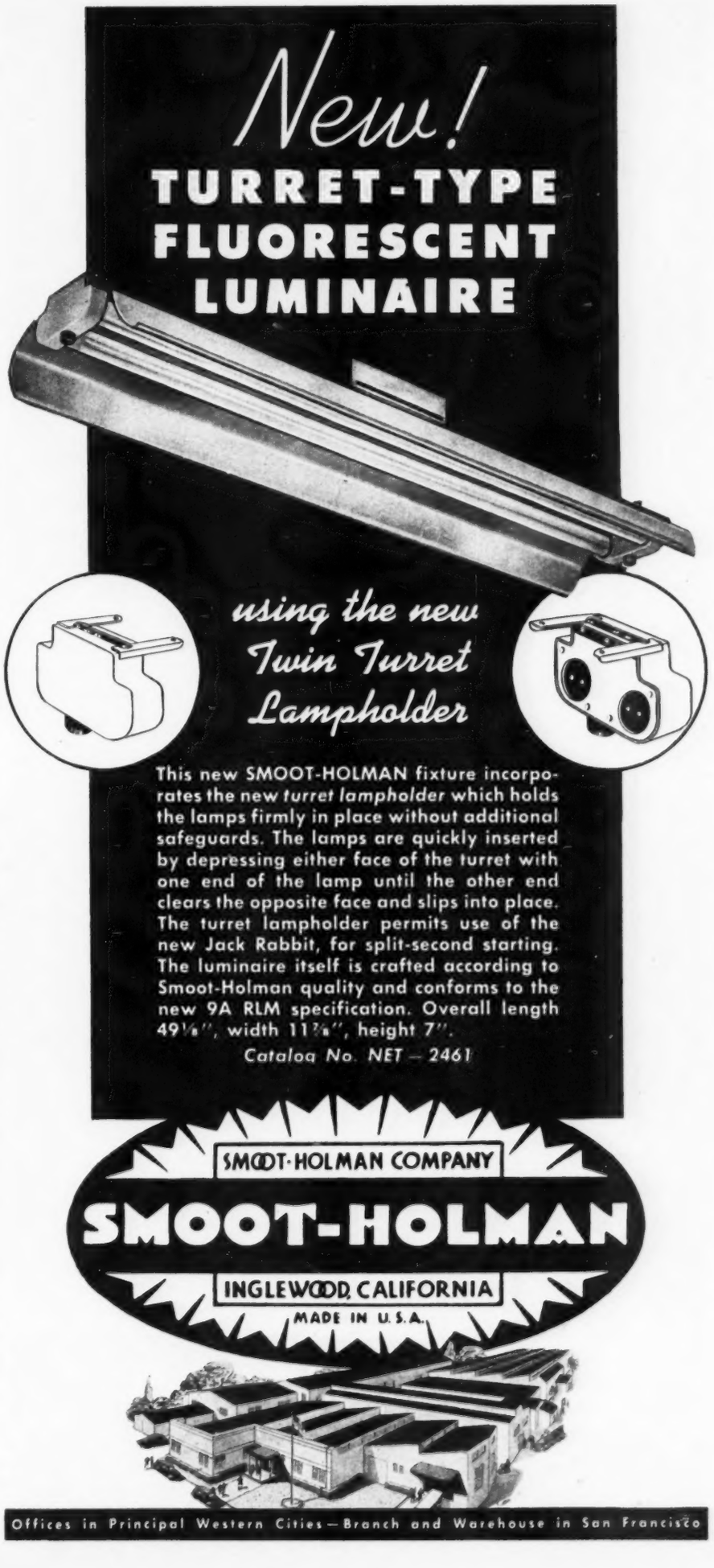
Rural Co-op Group Appeals for Funds

Meeting in Spokane last month, Region Nine, National Rural Electric Cooperative Assn., adopted resolutions asking for funds and appealing to WAA to re-examine its decision to exclude rural electrification cooperatives from its priority set-up by holding that they are neither non-profit organizations nor small businesses within the interpretation of the act.

Congressional representatives were asked to work for adequate loan authorization to carry the national program through the 1946 fiscal year, including $100,000,000 deficiency authorization to carry through June 30, 1947 and $250,000,000 for the 1948 fiscal year; for more adequate funds for REA administrative purposes; for funds for an adequate farm electrification research program to be performed by the agricultural research administration of the Department of Agriculture.

If appeal to the WAA fails, congress will be asked to amend wording of the act to include REA cooperatives as non-profit organizations, the group said.

Harry Hudlow, Ritzville, Wash., manager of the Big Bend Electric co-op, was elected national executive committeeman of Region Nine of the association.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TURRET-TYPE FLUORESCENT LUMINAIRE
using the new Twin Turret Lampholder
This new SMOOT-HOLMAN fixture incorporates the new turret lampholder which holds the lamps firmly in place without additional safeguards. The lamps are quickly inserted by depressing either face of the turret with one end of the lamp until the other end clears the opposite face and slips into place. The turret lampholder permits use of the new Jack Rabbit, for split-second starting. The luminaire itself is crafted according to Smoot-Holman quality and conforms to the new 9A RLM specification. Overall length 49⅛", width 11⅜", height 7".
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Above is Melvin G. Sues, familiarly known as Pete, whose biography appears under the heading "Getting Acquainted," page 73

Juneau City Council Has Option on Power Company

The Juneau, Alaska, city council has accepted the proposal of the Alaska Electric Light & Power Co., giving the city an option until April 1, 1947, to buy out the company's utility holdings for $900,000.

Terms of the resolution submitted by the light company and adopted by the council call for the repeal of previous rate ordinances and the ordaining of a compromise rate schedule which cuts one cent per kilowatt-hour off the first 100 kwh. of winter-month light usage and one-half cent per kilowatt-hour off winter light usage per month in excess of 100 kwh.

● COWLITZ County PUD, Longview, Wash., has called for bids for reconstruction of its steam plant. Originally installed in 1923, the plant consists of two boilers and is designed for burning hogged fuel. During reconstruction, the boilers will be converted for oil and hogged fuel consumption. The project, including suspended walls, water cooling systems, new oil burners and other equipment, is expected to cost about $200,000.

● FPC set $18,639,525 as original cost of Pacific Gas and Electric Co.'s Mokelumne River hydroelectric development, following its hearing last month. The decision eliminated $983,-108 claimed by the company. The plant is located on the north fork of the Mokelumne River in California; has an installed capacity of 85,500 hp.

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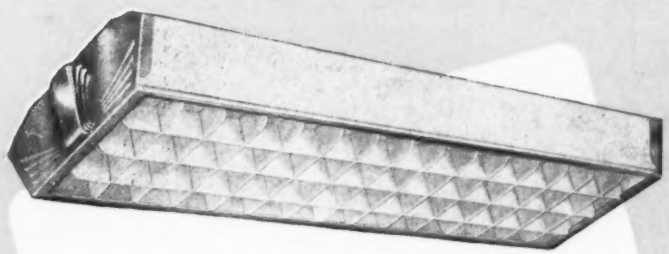
CONTRACTOR

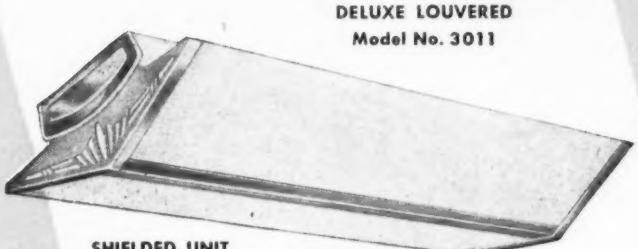
I PREFER MITCHELL Commercial Luminaires because they're easier to install and maintain—accepted absolutely by my customers as top-quality lighting units. I've had plenty of experience with commercial lighting installations, and *I'll* stay with MITCHELL, the line that builds acceptance for my skill and service.

USER

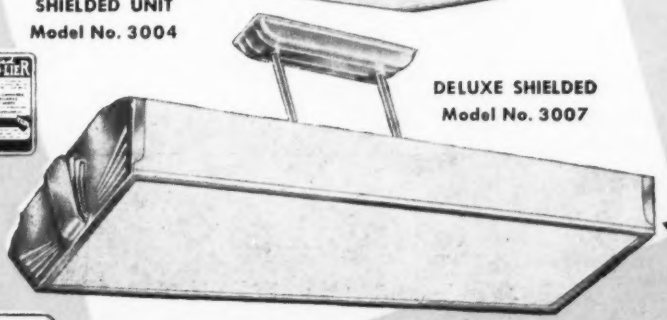
I PREFER MITCHELL Lighting because I know I'm getting carefully planned quality illumination to fit my needs. I like the combination of functional efficiency and modern beauty of design. MITCHELL Commercial Luminaires are a genuine asset to my business. *I play safe —I* buy from the house that sells MITCHELL.



DELUXE LOUVERED
Model No. 3011



SHIELDED UNIT
Model No. 3004



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SOUTHERN COLORADO POWER TELLS EXPANSION PLANS

W. N. Clark, president, has announced plans of the Southern Colorado Power Co., Pueblo, Colo., to supply power for a 3-million-dollar expansion program of Ideal Cement Co.'s plant at Portland, Colo. The project will involve stepping up Southern Colorado's Pueblo plant from 10,000 to 15,000 kw.

Simultaneously, Clark disclosed that the company's operating revenues for the year ending Aug. 31, 1946 were $3,291,462 compared with $3,154,327 the preceding twelve months. Net income currently is $441,046 against $272,083 a year ago.

● TUCSON RAPID TRANSIT Co., part of the Tucson, Ariz., assets of Federal Light & Traction Co., New York, has been sold for $260,944 to W. Colver White, Jackson, Miss., railroad executive, and John B. Tigrett, executive officer of the American Bus Lines. Disposition of the company's Tucson assets, including the Tucson Gas, Electric Light & Power Co., was ordered by SEC. Sale of the latter is still pending.

● A SURVEY is being made for a power transmission line from the proposed Garland No. 2 substation near Garland, Wyo., to the site of Yellowtail Dam. Power for construction of the dam will be transmitted over the line from the generating facilities of Shoshone and Heart Mountain power plants, Bureau of Reclamation officials have reported. Yellowtail Dam, where preliminary work has been started, is a part of the Hardin unit of the Missouri Basin project.

● GRAYS HARBOR PUD commissioners at Aberdeen, Wash., have authorized construction of a power extension to the American Mill and improvements to the Electric Park substation, according to Kelly Westrom, manager. Substation improvements, costing an estimated $16,790, will include installation of a new oil circuit breaker, disconnecting switches and lightning arresters. The extension will cost an estimated $10,144.

● IDAHO COUNTY Light & Power Cooperative Assn. at Grangeville, has begun preliminary work on a 140-mile line extension, Paul Smick, manager, has announced. Vern Ashley Engineers, Coeur d'Alene, conducted the survey. The co-op now has 308 miles of energized line serving 581 customers. Another 250 customers will be served by the extension, Smick said.

LOS ANGELES ADOPTS NEW ELECTRIC RATE SCHEDULES

The Los Angeles Board of Water and Power commissioners has adopted revised rate schedules that will save electric users $1,566,000 annually. The city council must adopt an enabling ordinance to make the new schedules effective.

Residential, commercial and industrial consumers will share in the savings, which average 3.29% for homes, 6.08% for the commercial general lighting group, and 1.44% for industries and other power users.

A change in the lighting circuit base from the present eight to ten circuits or less will permit the average home to have more lighting circuits in accordance with modern wiring trends, without additional rate charges.

Sierra Pacific Power Puts In Lower Rates

Sierra Pacific Power Co., Reno, Nev., has announced a new rate schedule which will result in annual savings to customers of approximately $103,000. Increased business made the reduction possible, it was stated.

In the Reno-Sparks area, largest served by the utility, reductions of 6.7% for residential and 5.9% for commercial users are now in effect, while other communities benefited by Sierra Pacific's action by as much as 33%.

Domestic and commercial schedules had been lowered by the company in the Lake Tahoe area on May 1.

● THE ARIZONA CORPORATION COMMISSION recently ruled that it is to pass on all agreements between utilities and other companies for purchase of wholesale power. This decision followed the commission's discovery at a power hearing at Winslow that the Arizona Power Co. had entered into verbal agreements to furnish power to several sources, including the Phelps Dodge Corp., with no notice given the commission. The commission contended that it could not determine proper rate base for a utility's retail customers without knowledge of wholesale rates.

● ANNOUNCEMENT that users of electricity in the Miami, Ariz., area would receive a substantial reduction in their rates on all billings on and after Nov. 1 was made recently by the Arizona Edison Co. Inc. This is the ninth time that electric rates have been reduced since the company began serving in Miami in 1935, H. D. Ward, manager, said.

RELIANCE AUTOMATIC TIME SWITCHES

Model "W"

Completely automatic . . . extremely simple, compact, economical . . . three types cover practically every requirement . . .

Astronomic Time Switch

• The Model "W" Astronomic types are particularly popular for advertising illumination. The "on" operation changes daily to correspond with local sunset time, eliminating the necessity of re-setting the dial as the days become longer or shorter.

AMERICA'S RELIABLE 24 hour-a-day GUARDIANS

RELIANCE Time Switches have proved their dependability. They give complete and reliable service under many varied conditions — a factor of paramount importance when constant good service is essential. Send for catalog and price sheets for complete details.

RELIANCE AUTOMATIC LIGHTING CO.
1907 MEAD STREET RACINE, WISCONSIN

BLACKBURN Service Entrance CONNECTORS are the strongest on the market—yet they are small and compact. Made of DURONZE—the alloy that is 75% stronger than hard copper or commercial bronze—they will not stretch or distort, nor come loose. They're the most durable connectors on the market today. *It pays to use a QUALITY product*—and cut maintenance costs. Get BLACKBURN Connectors from your Jobber today!

BLACKBURN Service Entrance CONNECTORS

★ OVER 100 CONVENIENTLY-LOCATED JOBBERS' STOCKS

BUILDERS OF QUALITY CONNECTORS FOR OVER 10 YEARS
JASPER BLACKBURN PRODUCTS CORP.
FIRST, MADISON & CLINTON STS. • ST. LOUIS 6, MISSOURI

B. C. ELECTRIC REVISES EMPLOYEE PENSION PLAN

Reorganization of the B. C. Electric pension plan and expenditure of $7,000,000 to establish a new system was announced recently by President A. E. Grauer. With funds and interest rates guaranteed by the federal government, the plan offers a 50% higher pension on a joint contribution basis to employees having three years' service.

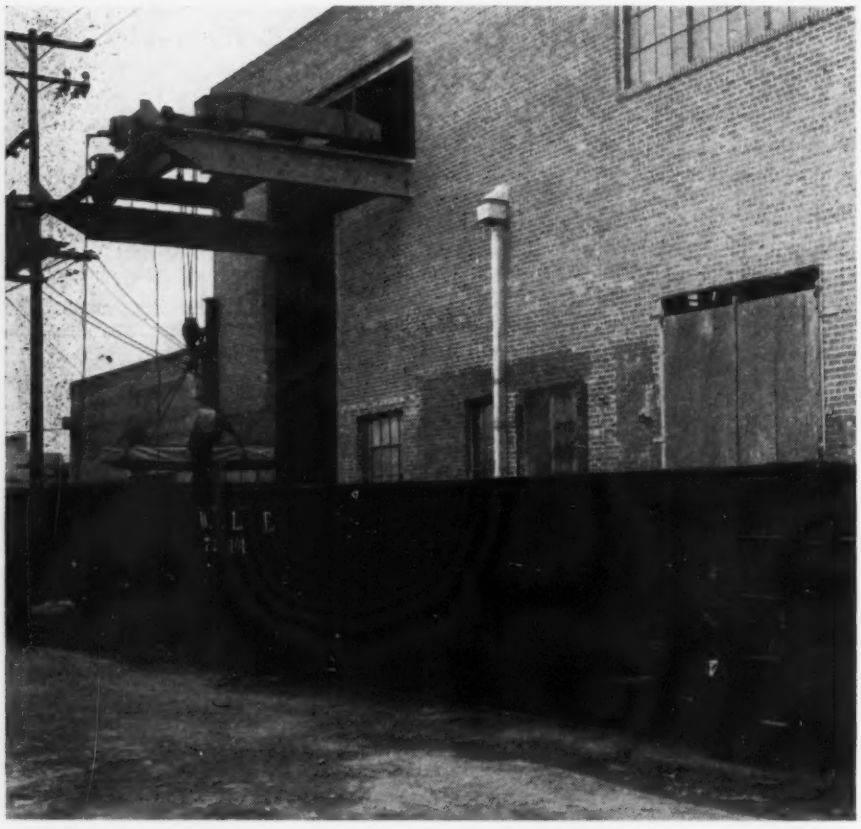
The company had paid the entire cost of the previous plan and will pay the cost of making the pension retroactive for employees who have served three years or more.

Each employee who enrolls (participation is voluntary) will contribute 4% of his earnings and the company will pay slightly more than 4%, providing an annuity of 1½% of earnings for each year of future service. In addition, the company will make past contributions totaling $7,000,000 (over a period of several years) to give each participant an annuity of 1% of his 1945 earnings for each year of accredited past service.

Normal retirement age for men is 65; for women 60. Upon retirement, the Government Annuities Branch guarantees to pay the annuity as long as the employee lives and, if death occurs before five years' payments have been made, to pay the balance of such payments to the beneficiary. If death occurs before retirement, the beneficiary receives a lump sum of all contributions, plus 4% compound interest, and all or part of the company's future service contribution, plus interest, depending upon years of service.

Employees who leave the company before retirement age receive paid-up annuities based on their contributions.

CONSTANT IMPROVEMENT
a Gardner policy for 37 years



Holden Street elevation of new plant, showing material being unloaded at the Receiving Dept.

Visible proof is the new Gardner Electric plant in Emeryville. This modern plant represents a forward stride in line with a 37-year tradition.

But even more important to you, our customer, is the steady progress made in the engineering of the product. Gardner transformers embody best practical designs for long and trouble-free life and economical operation.

Every Gardner transformer is designed and built to serve efficiently—to prove the slogan: Gardner Transformers Guard Profits.

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EMERYVILLE 8, CALIFORNIA
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San Francisco Los Angeles Portland Seattle

Union Cannot Bargain for City Employees, Seattle Says

Petition by Local B-77, Electrical Workers Union, for recognition as a special bargaining agency for Seattle City Light employee wages and working conditions was denied by the Seattle City Council, which thus refused to establish a precedent for collective bargaining with city employee groups.

In a prepared statement, the council pointed out that city employees are under civil service; that the fact that clerical and other personnel are members of Local B-77 in no wise changes their status as civil service employees; that as such, their salaries must be the same as other city employees in like civil service classifications; that it is the policy of the council to meet bonafide wage scales negotiated through unions and private employers.

● An Agreement binding unions in electric utilities not to strike without first trying to invoke the use of voluntary arbitration or fact-finding, is being sought by the U. S. Conciliation Service, which is said to have an official understanding from AFL's IBEW that it would consider going along on such an arrangement under the proper circumstances. Reportedly CIO's Utility Workers have not been sounded out on the proposition. Posing a problem are scattered independent unions, from whom it would be almost impossible to get a general commitment.

● National Labor Relations Board has dismissed the petition of the International Brotherhood of Electrical Workers for certification as bargaining representative for office and clerical employees of Pacific Gas & Electric Co.'s Stockton division. In a recent election 54 employees voted against and 25 for recognition of IBEW.

● Construction of a three-story addition to the Salt River Valley Water Users Assn. building in Phoenix, Ariz., has been approved by the association's board of governors and council.

"Certified" ON A BALLAST...
IS MORE THAN A WORD!
. . . Measuring Certified Ballast temperatures while ballast is operating in an actual fluorescent fixture.
Hot Box! Certified Ballasts are tested and checked against *overheating*. Test oven determines temperature rise.
Certified Ballasts are checked and rechecked in actual service—an additional safeguard for high quality.

When fluorescent lighting fixtures are equipped with Certified Ballasts, you and your customers are protected

YES, "CERTIFIED" on a ballast means that this ballast has been built to exacting specifications set up by lighting experts . . . that it has been *tested, checked* and *CERTIFIED* by impartial Electrical Testing Laboratories, Inc.

"Certified" further means ballasts that are *quiet* in operation . . . protected against overheating . . . and long lived. And they cost no more than any other ballasts!

Write today for new booklet, "The Story of Certified Ballasts".

Certified Ballast Manufacturers

Makers of Certified Ballasts for Fluorescent Lighting Fixtures

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Chicago Transformer Div.
Essex Wire Corporation
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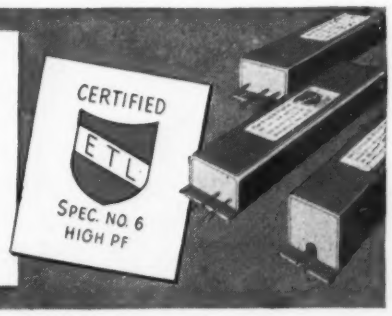
General Electric Co.
Specialty Transformer Division
Fort Wayne, Ind.

Jefferson Electric Co.
Bellwood, Illinois

Sola Electric Co.
2525 Clybourn Avenue
Chicago 14, Illinois

Starring and Company
Bridgeport, Conn.

Wheeler Insulated Wire Co., 378 Washington Ave., Bridgeport, Conn.



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THE Lenk MFG. COMPANY
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Manufacturers of Soldering Equipment Since 1919

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Electrical Connectors
They've Got Everything!
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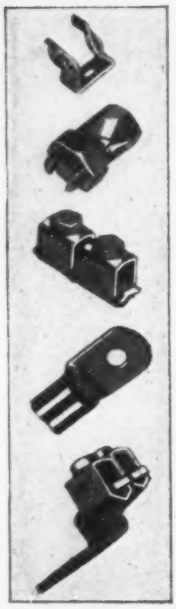
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PEOPLE
made this news

● RECENTLY named district managers for the General Mills home appliance department are: Robert Zurcher, Pacific Northwest, with headquarters in Portland; George A. Gillespie, Pacific Central, San Francisco; George E. Newlin, Pacific Southwest, Los Angeles. Zurcher, before the war with McKesson Robbins at Portland, was released recently from the Army with the rank of lieutenant colonel. Gillespie was with Westinghouse for eight years, most recently as district appliance manager for northern California. Newlin has been in the home appliance and allied fields for 18 years, having served with Graybar, Proctor and Easy.

● GEORGE STEPHEN PERKINS has rejoined G-E following his release from the service and will be receiver representative for the company's San Francisco electronics department. A captain during the war, he was one of the few Navy men to be awarded the Army Bronze Star medal.

● F. ELLIS JOHNSON will be in charge of educational activities at the G-E Hanford Engineer Works, Richland, Wash. He was dean of the college of engineering at the University of Missouri from 1935 to 1938 and has held a similar position at the University of Wisconsin for the past eight years.

● J. VERNE GONGWER, chief engineer in charge of construction of Tacoma's second Nisqually development, has resigned to go into business for himself as a consulting engineer. He had been with Tacoma City Light intermittently for 18 years and also worked on TVA construction.

● W. M. HAMILTON will retire Jan. 1 as Williamette Valley division manager for Portland General Electric Co. He is completing 41 years of service with the organization.

● FRED G. STARRETT will succeed W. M. Hamilton as PGE manager in the Williamette Valley. He has been assistant manager for the past year and will be succeeded in that post by DAVID A. WRIGHT, who will be promoted from division superintendent.

● R. EARL FISHER, vice-president of Pacific Gas and Electric Co., has been appointed northern California chairman for the Committee of Economic Development.

● JOHN T. WADE has joined the Miller Co. as Pacific Coast manager, succeeding ALFRED T. BERGERON, recently promoted to a managerial position in the factory. Wade has had long experience in lighting sales for Utah Power & Light Co. and Pacific Gas and Electric Co. He recently returned from the U. S. Army as a captain.

● C. H. PROUTY, manager of the Pacific Gas and Electric Co.'s land department, has been granted a leave of absence of several months, due to ill health. On his return, he will become special assistant on land matters to the executive engineer.

● B. K. DUNSHEE, PG and E claims and safety department manager, has succeeded C. H. PROUTY as manager of the land department. The claims and safety department is now headed by RAYMOND W. WHITE, formerly associate attorney in the company's law department.

● GEORGE KINSMAN will become PG and E rate engineer and B. B. BECKETT, special rate engineer, on Jan. 1. Kinsman will have charge of the rate and statistical departments and the library.

● THOMAS T. PARKER, for six years executive electrical engineer for Arizona Edison Co., at Phoenix, has resigned to become commercial power superintendent of the Imperial (Calif.) Irrigation District. He succeeds STEVENS H. HARRIS, who resigned to go into private business.

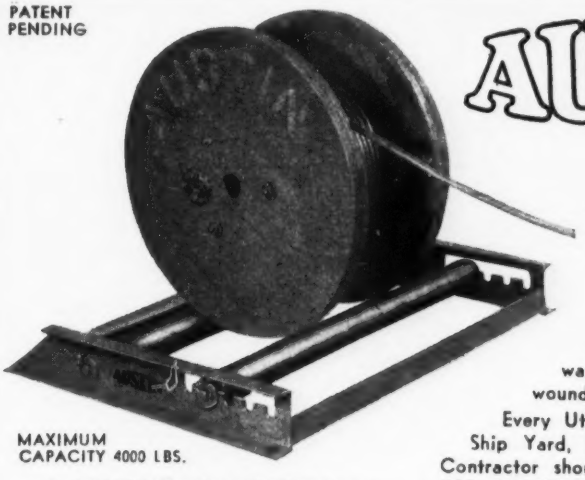
● JACK HARGROVE, former vice-president and sales manager of Kinney Bros. in Los Angeles, has moved to Chicago as executive vice-president of the Miracle Electric Co. He will supervise sales and merchandising of appliances through distributors and dealers.

● IRVING C. HARRIS has been appointed construction engineer at Shasta Dam. He formerly was acting construction engineer in charge of all work at Shasta and Keswick dams and on the Oroville-Sacramento transmission line.

● E. B. BOMAR has joined Ilg Electric Ventilating Co. as Phoenix manager. He had been Arizona sales representative for DayBright and previously was with the J. E. Redmond Co. of Phoenix.

● VERE HALLIDAY, training director for Utah Power & Light Co., resigned from the power company to become district salesman for General Electric Supply Corp. in Salt Lake City.

PATENT PENDING



MAXIMUM CAPACITY 4000 LBS.

AUSTIN

NO. 600 REEL ROLLER

A new quick, easy, safe way to dispense any material wound on a reel.

Every Utility, R. E. A. Cooperative, Ship Yard, Railroad, Wholesaler and Contractor should have several AUSTIN REEL ROLLERS. When pulling one or more cables into conduit use an AUSTIN REEL ROLLER for each cable. Can be mounted stationary or used on the job as a portable device—ideal for service and repair trucks.

9 OUTSTANDING ADVANTAGES

(1) Ramp—makes it quick, easy and safe to load the reel.
(2) Back roller is slightly higher, preventing the reel from being pulled off the roller when cable is removed.
(3) Reel rolls on grease packed flanged ball bearings with the greatest of ease and safety. No backlash.
(4) Thumb screw, which when tightened, prevents roller from turning for easy and safe removal of reel.
(5) Lag screw hole in each corner for stationary mounting. Hole in each side for bolting rollers together.
(6) Heavy steel frame, painted bright orange, not only adds to its appearance, but, also, makes it readily visible on the floor which helps to eliminate accidents.
(7) Five adjustable slots to take various reel diameters. No screws, washers or cotter pins to remove—simply raise up the roller and slide into the slot required.
(8) Will take any reel up to 30" in width. For larger reels, use two reel rollers and bolt together end to end.
(9) Can be used in the warehouse, on the job or truck.

PRICE $37.50 EA. NET
2% CASH 10 DAYS F.O.B. CHICAGO, ILL.
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*Patent No. D-141024. Others pending. Underwriters approved.

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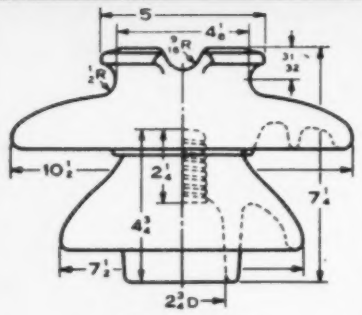
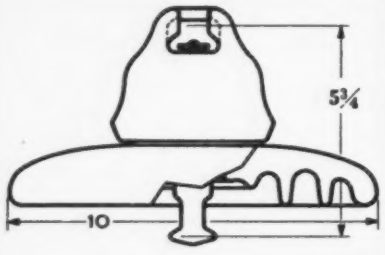
THOMAS
PORCELAIN
INSULATORS



NO. 2124-M
45 Kv. Rating

Dry Flashover . . . . . 125 Kv.
Wet Flashover . . . . . 85 Kv.
Rec. Pin Height . . . . . 8 In.
Std. Pkg. Crate 6

This insulator generally used on 33 Kv. can also be furnished in one-piece design (No. 1924). Mechanical, thermal and electrical characteristics are well balanced insuring long life in service.



NO. 21243
15,000 Lb. Min. Combined M. & E. Rating

Dry Flashover . . . . . 80 Kv.
Wet Flashover . . . . . 50 Kv.
Leakage Distance . . . . . 11½ In.
Std. Pkg. Crate 6

This design is offered in a wide range of spacings in both Ball-Socket and Clevis types which fulfill all strain insulator requirements.

● Service records prove these units will serve faithfully under all conditions. Call our nearest sales representative for speedy delivery.

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THE R. THOMAS & SONS CO.
LISBON, OHIO

● WILLIAM E. TROMMERSHAUSEN has been appointed manager of the Bonneville Power Administration's southwestern district office at Eugene, Ore., succeeding Chesley Brazil, who has been appointed administrative officer of the division of power sales and services in Portland. Trommershausen has been serving as assistant manager of the district office since Sept. 30. He joined the Bonneville staff in 1940 as field engineer after four years of engineering work with the Yamhill Electric Co., Newberg, Ore., and the REA in Washington, D. C. His four-year army experience included a year of service with the Allied Military Government in Italy and Austria as electrical engineer.

● WILLIAM N. WARNER is personnel director for the Sacramento Utility District. Warner was formerly connected with the Bank of America, and later in personnel work with the Alameda County Civil Service Commission. He served in the war as radar officer, U. S. Navy, where he received the Navy Marine Corp Medal for rescue mission at Okinawa.

● J. F. BARRETT has been made assistant commercial manager for the Sacramento Municipal Utility District. Barrett had been with the Pacific Gas and Electric Co. Sacramento division for 25 years.

● H. R. LA FORTUNE heads the purchasing and stores department for the Sacramento Utility District. He was connected with the purchasing department of the California and Hawaiian Sugar Refining Corp. for 18 years.

● DONALD C. KETCHAM has been named assistant power manager for the Reclamation Bureau's Region 6, covering North and South Dakota and parts of Montana and Wyoming and with headquarters at Billings. Ketcham was a regional power supply engineer handling New York State and New England for the Office of War Utilities during the war.

● GEORGE A. GREGORY, in charge of construction of the Alder Dam and power house for Tacoma City Light, is leaving soon for China to serve as principal construction engineer for the national hydroelectric bureau of the National Resources Commission of China.

● ALBERT W. NEWCOMER, USBR design and construction engineer, Denver, has gone to Venezuela to investigate locations for multi-purpose projects. His appointment followed a request from the Venezuelan government.

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TORK
CLOCKS
NOW WITH ASTRONOMIC DIALS

For all types of electrical switching and time control, Tork Time Clocks will control operations efficiently and automatically. Self-starting, all-electric. For minutes, hours, days or weeks. Special models designed to specifications.

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Opportunity for permanent placement with a Large Utility Corporation is currently available to a Graduate Electrical Engineer able to qualify as follows:

Thorough knowledge of modern power cable work, including high voltage transmission cable. Considerable practical experience in cable engineering and operating all voltages. Experienced in the preparation of designs, estimates, reports, etc. Take charge of cable engineering staff.

State details in full concerning above; age and approximate salary desired, date available and address all replies to

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One (1) experienced graduate engineer, responsible charge electrical engineering and design of steam-electric and hydro-electric power plants and high voltage substations. Applicants please furnish personal data and Experience Record.

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Electricians and Motor Repairmen
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The Case of the INQUIRING LIGHTING SALES MANAGER

Chapter Three: HE LEARNS ABOUT FLEUR-O-LIER ADVANTAGES

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For those who tuned in late, FLEUR-O-LIERS are fluorescent lighting fixtures made to exacting specifications, set up by lighting experts, for performance, construction and service. They are tested, checked and *certified* as meeting those specifications by independent experts, Electrical Testing Laboratories, Inc., and identified by the ETL Certification Label, shown below.

What important *features* do FLEUR-O-LIER specifications cover?

We're glad you asked. They cover electrical and mechanical safety, durability, *Certified* high power factor ballasts, *Certified* starters, efficient lighting performance, ease of maintenance and many others.

Are all these manufacturing standards rigidly maintained?

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This Label is your clue to good lighting fixtures!

It is your definite assurance of *electrical, mechanical and lighting excellence* in fluorescent lighting fixtures!

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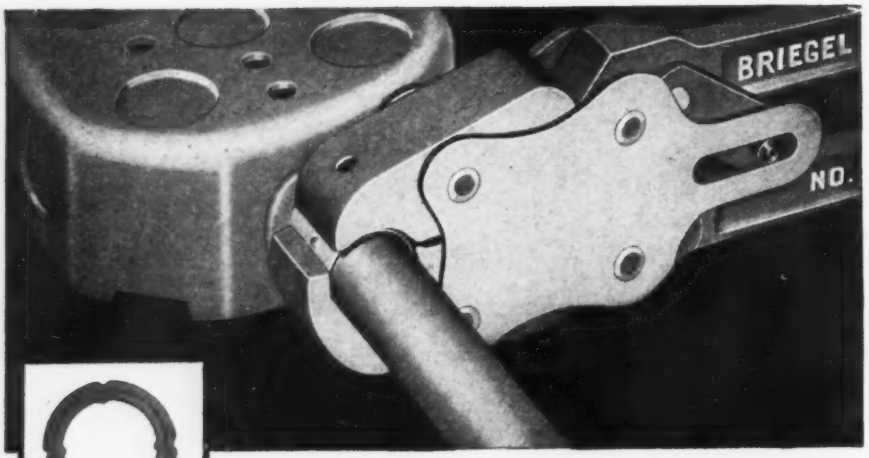
Fleur-O-Lier is not the name of an individual manufacturer, but of a group of 27 leading fixture manufacturers. Participation in the FLEUR-O-LIER MANUFACTURERS' program is open to any manufacturer who complies with FLEUR-O-LIER requirements.



Cross section Showing Indentations.

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TWO QUICK SQUEEZES give you Finer, Faster Conduit Connections. B-M Fittings do away with the twisting, turning and tightening of nuts and save you valuable time and materials. Then too, they are stronger, neater and much easier to work with in tight places. Start using B-M Fittings today. Have more satisfied customers—more profits from each job!

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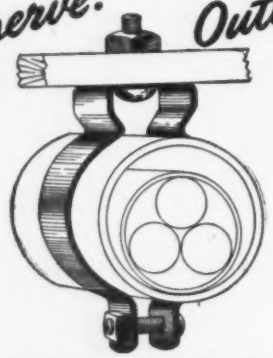
Steel HANGERS, CLIPS, STRAPS

Outserve! Outlast!



Minerallac Cable, Conduit and Messenger Hangers are STEEL. Easier, quicker to install; permit speedy, compact wiring; economical. Also in Everdur . . . Porcelain Insulating Bushings available.

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Jiffy STEEL Clips (Pipe-clamp) require only one screw, nail or bolt; rib-strengthened; for hanging pipe, conduit, BX cable, mounting coils, etc. Millions in use.

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Steel Straps for Messenger-cable services on outlet boxes; may be used in conjunction with hangers.

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Lead—Braid Covered Cables and Wires
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STERLING SIREN CO.
Electric Sirens

DONGAN ELECTRIC MFG. COMPANY, INC.
Transformers

TRICO FUSE MFG. CO.
Fuses, Oilers, Clip Locks and Fuse Pullers

KNOX PORCELAIN CORP.
Electrical Porcelain

● REORGANIZATION of the public relations, publicity and advertising branches of the B. C. Electric Railway Co. at Vancouver, have been announced by A. E. Grauer, president. HAROLD J. MERILEES, public relations assistant, will head a new department of public information, which will administer all company advertising, press and public relations. JAMES LIGHTBODY, for many years publicity manager, will take charge of a new department of publications. EARL F. CAMPBELL, PETER G. WOODWARD and T. F. DAGGS will assist Merilees. Campbell becomes director of advertising. Woodward will head the press and radio news branch and Daggs becomes assistant in charge of public relations activities.

● E. R. CRAMMON, director of the B. C. Electric Railway Co. recently arrived in Vancouver from London. Crammon is chairman of the British Empire Trust Co., which supplied much of the original capital for B. C. Electric, and was elected on the board this year as representative of British shareholders.

● PHILLIP DONALD of the electrical repair department of the B. C. Electric Railway Co. Ltd. has been transferred to the dealer development division of the company in the capacity of appliance repair consultant. He has been in appliance repair for 14 years and, with the company's withdrawal from appliance merchandising, will be available to dealers in an advisory capacity.

● TOMLINSON FORT of East Pittsburgh, Pa., manager of the central station division of Westinghouse Electric Corp., spoke to members of the Spokane Section, AIEE, at the Oct. 22 meeting in the Davenport Hotel. Fort said that farm electrification is largely responsible for boosting the postwar consumption of electricity to its present high levels. He also told the group that Westinghouse is spending $132,000,000 on plant expansion and that the company's largest single order is for six 108,000-kva. generators for Grand Coulee Dam.

● WARD R. SCHAFER, well known in the West, where he formerly was Hotpoint manager, has joined Ideal Industries Inc. as general sales manager. Prior to acceptance of the post with Ideal, he was Hotpoint's vice-president in charge of sales.

● W. J. OLSON has been placed in charge of the operating division of Seattle City Light, succeeding B. C. MOOERS, who has retired. Olsen has been with City Light for 30 years.

● FRANCES HERRING, research director for the Public Utility Districts Research and Information Service at Seattle, Wash., has been appointed acting executive secretary. Mrs. Herring succeeds Bernard Pearce resigned. Pearce, whose resignation was requested due to political activities, has accepted a position in Seattle with Group Health Cooperative. (E. WEST, October, p. 116).

● ROBERT L. KING, formerly designer for Neon Products of Western Canada Ltd. at Vancouver, its B.C. head office, has been appointed art director for the company on Vancouver Island. He will have headquarters at Victoria. King has been with the Neon Products for six years, and returned from army service a few months ago.

● EUGENE L. BETTANNIER, general manager of Pasadena's Municipal Light and Power Department, was elected to the grade of Fellow at a recent meeting of the board of directors of the American Institute of Electrical Engineers in New York.

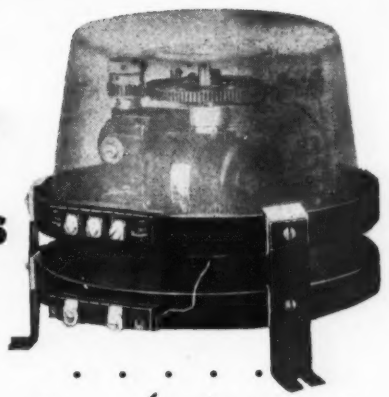
Deaths

● CLARK STANDIFORD, president and manager of the Ma-Yu Electric Cooperative Inc., of Maricopa and Yuma counties in Arizona, died recently in Porterville, Calif. Born 70 years ago in Galesburg, Ill., Standiford spent his youth in his native state, Nebraska, Idaho and Indiana. He was graduated from Valparaiso College in Indiana. He was associated for several years with the Western Pacific Railway as a departmental superintendent. He also engaged in the lumbering business in the Northwest, citrus farming in California and owned and operated radio broadcasting stations in Nebraska.

● CHARLES HUGHES, retired district manager for the Pacific Gas and Electric at Red Bluff, Calif., died last month at the age of 82. In 1900 Hughes joined the Red Bluff Light & Gas Co. When this firm was absorbed in 1903 by the Northern California Power Co., he became district manager, a position he maintained until 1919 when PG and E took over. He retired from active service in 1937.

● ALMA HENRY WEST, 62, manager of Utah Power & Light Co.'s American Fork plant, died Nov. 11 of a heart attack. Mr. West, veteran of 40 years with the company, was superintendent of the Idaho Falls, Ida., plant until seven years ago, when he moved to American Fork, Utah.

SMALL MOTOR DRIVE FOR RHEOSTAT ASSEMBLIES



• Bulletin 60 Motor Drive offers the ideal means for remote control of single or multi-plate Rheostat Assemblies. It is built on a 13" diameter steel plate for operation of Rheostats up to three plates and is available with either series or shunt motors for 115 or 230 volt operation.

features

1. All parts immediately accessible by removal of dust-tight cover.
2. Precision type snap action adjustable limit switches.
3. Motor with heavy duty gear box protected by slip-clutch.
4. Cast mounting base for motor, gears, limit switches and drive shaft maintains allignment.

WARD LEONARD
RELAYS • RESISTORS • RHEOSTATS
Electric control devices since 1892

Send for Bulletin 60A which gives complete information and prices on the Ward Leonard Small Motor Drive for Rheostats.

WARD LEONARD ELECTRIC COMPANY
68 SOUTH STREET, MOUNT VERNON, N. Y. • OFFICES IN PRINCIPAL CITIES

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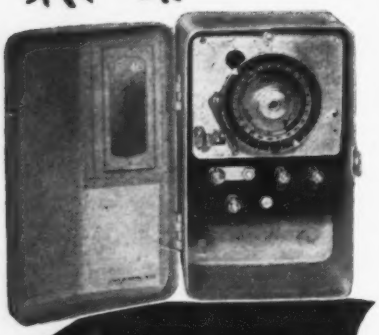
ADVANCE BALLASTS
FOR UNEXCELLED PERFORMANCE

Leading manufacturers of lighting fixtures use and recommend "ADVANCE" Ballasts for QUIET operation, high efficiency performance, low replacement cost and long life. "ADVANCE" Ballasts are streamlined for easy installation in fixtures and are approved by Underwriters Laboratories.

ADVANCE TRANSFORMER CO.
Cable Address: ADTRANS
1114 W. Catalpa Ave. Chicago 40, Ill., U. S. A.



New PS-30
POULTRY
TIME SWITCH
by Paragon

NEW LOW PRICE
$12.75 LIST . . .
Telechron Motored

A low price switch with evening dimming feature. Authorities have proven that both morning and evening lighting greatly increases egg production per pound of feed.

Cash In Now!

Large quantities of the new PS-30 and basic materials for additional quantities are now in Paragon stocks. Recent enlargements in plant . . . modernized manufacturing methods . . . availability of raw materials . . . make savings in manufacturing costs reflected in the new low price. Order your poultry switches now.

Paragon designs and manufactures time controls for every need.

PARAGON ELECTRIC COMPANY
1616 Twelfth St. • Two Rivers, Wis.

SALES REPRESENTATIVES

McCUNE-MERIFIELD COMPANY
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51 Fremont Street San Francisco, California
72 Marion Street Seattle 4, Washington

Paragon Two Rivers WISCONSIN
BUILDERS OF ELECTRICAL EQUIPMENT . . . SINCE 1905

TRADE notes

● BRYANT ELECTRIC CO. was to move its Pacific Coast headquarters from San Francisco to Los Angeles about the middle of November. The new warehouse and headquarters for the Pacific Coast will be at 3310 Leonis Blvd. in Vernon, a suburb of Los Angeles. Freeman Scharr, Pacific Coast manager for the past several years, is resigning and R. L. Gill Jr., who has been a Los Angeles salesman, will become Pacific Coast manager. Representation for the company in San Francisco will be handled by R. V. Jacobsen, and in Seattle by E. W. Bauer.

● GENERAL ELECTRIC has opened a new service shop and warehouse in Denver at 3353 Larimer St. The shop is equipped for complete servicing and maintenance of electrical apparatus and will service Colorado, Montana, Wyoming, northern New Mexico, western South Dakota, western Nebraska.

● BETHLEHEM PACIFIC COAST STEEL CORP. has announced expansion plans for plants in Seattle, South San Francisco and Los Angeles. According to H. H. Fuller, president, the program as planned represents the West Coast company's largest investment for new equipment and facilities.

● EARL S. CONDON CO., manufacturers' representative, has a new office location, 754 Chamber of Commerce Bldg., 1151 S. Broadway, Los Angeles 15. Condon represents U. S. Rubber Co., wire and cable division, Lapp, Burndy and Cole Electric.

● COOPER SCREW MFG. CO. of Los Angeles has been acquired by the Russell, Burdsall & Ward Bolt & Nut Co. of Port Chester, N. Y. R. A. MacDonald will be plant manager at Los Angeles; Charles D. Brenner, sales manager.

● L. W. HOWARD has joined the Triad Transformer Mfg. Co., 423 Northwestern Ave., Los Angeles, formerly known as the Electronics Components Co. Howard formerly was associated with Peerless Transformer Co.

● FRED CAVELL has purchased the Home Radio Service, 4464 Dunbar St., Vancouver, B. C. Cavell was a member of the service department of this business prior to going overseas with the Signal Corps.

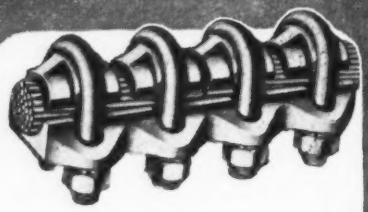
● IN RECOGNITION of its development of the mirror oscillograph, General Electric was given a scroll of achievement by the Society of Motion Picture Engineers. Presentation was made by Donald E. Hyndman, SMPE president, to S. E. Gates, G-E Los Angeles manager, at the society's sixtieth semi-annual convention banquet on Oct. 23.

● HUME & RUMBLE, electrical contractors, Vancouver, B. C., have received the electrical subcontract for alterations involving the expenditure of $20,000 on a one-story wing at Shaughnessy Military Hospital, Vancouver. The wing is being remodeled for a blood transfusion depot and will provide specialized laboratory facilities.

● SLATER'S Radio & Appliances, Chilliwack, B. C., has been appointed exclusive dealer in the district for the electrical appliance line of the Northern Electric Co., Ltd., according to an announcement by W. Herbert Slater.

MOTORS, GENERATORS, TRANSFORMERS
1 — 1500 H.P.
Bought and Sold
New and Rebuilt
ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.

Conductor Fittings



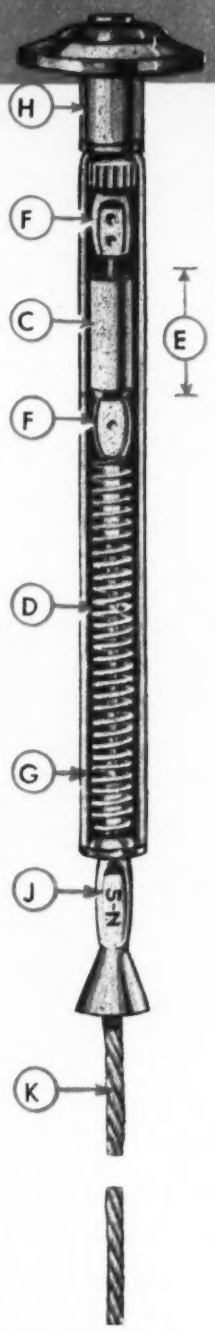
You'll find *all* good types of Straight and Parallel Connectors in the *Complete* line—all sizes: Bolted straight connectors, screw type, various split sleeve types, shrink fit, universal clamps, E-Z connectors with yoke and nut, etc.

Penn-Union also makes the *complete* line of Service Connectors, Tees, Cable Taps, Grounding Clamps, Lugs, etc. Leading users have found that *"Penn-Union" on a fitting is their best guarantee of unfailing service.*

PENN-UNION ELECTRIC CORP.
ERIE, PA.

PENN-UNION

Don't Forget Your ABC's of FUSE LINKS



S & C Spring Type
Universal Fuse Link
1 - 5 Amperes

REAL dependability . . . definitely distinguishing S & C Fuse Links . . . stems from 35 years of high voltage fuse specialization, and is the direct result of the most painstaking research and engineering in every last detail.

Every responsible distribution man should know that S & C Fuse Links embody *all* of these vital operational features:

Permanent High Surge Capacity **Uniform Quality**
Resistance to Corrosion and Deterioration
Sustained Accuracy **Mechanical Strength**

. . . and the reasons why can be readily understood and appreciated with an examination of this

ABC Check List of S & C Silver Fuse Link and S & C Spring Type Fuse Link salient features

A Fusible Element (not of tin, but) of pure silver . . . does not deteriorate mechanically, electrically, or chemically. Helical coil construction permits thermal expansion without damage.

B High Resistance Strain Wire (of Silver Fuse Links) prevents impairment of time-current characteristics by mechanical strain.

C Shield (of Spring Type Fuse Links) protects against deterioration from corona. Helical form of construction provides corona protection in Silver Fuse Links. (See also "A.")

D Tension Spring (of Spring Type Links) improves cutout operation when the fuse is blown on low over currents. *Non-additive spring loading* of the high strength fusible element to (not 1 or 2, but) 8 lbs. insures accurate melting characteristics and surge capacity independent of the tension imposed by the cutout.

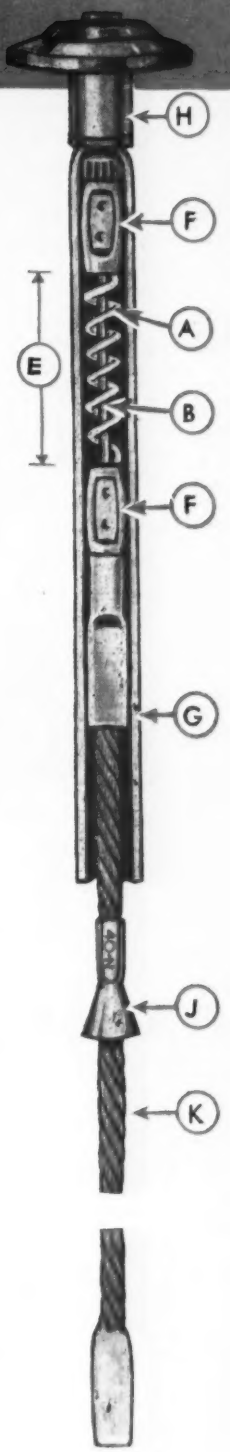
E Fusible Section has positively and accurately controlled physical characteristics capable of withstanding repeated surges without progressively changing the time-current characteristics, when the fuse is not blown.

F Fusible Element Terminals have sufficient size to preclude impairment of element resulting from temperature rise in terminals; also large enough to withstand arcing following melting of the fuse link.

G Horn Fiber (not paper) Enclosure . . . correct material and dimensions to aid in the interruption of low fault currents; also protects fusible element against mechanical damage; is varnished outside to prevent warpage.

H (Also J) Upper and Lower Terminals are silver surfaced for better contact.

K Cable of sufficient current-carrying capacity to carry load current without undue heating . . . to withstand short circuit current without fusing . . . and sufficiently flexible to be readily expelled from the fuse tube.



S & C Silver
Universal Fuse Link
7 - 100 Amperes

For full information, write today for Bulletin 218-B.

SCHWEITZER & CONRAD, INC.

4425 Ravenswood Avenue Chicago 40, Illinois, U.S.A.

MODERN ALCHEMIST

...producing the world's foremost resistance alloy!

Nichrome*

This modern metallurgist is alloying nickel and chromium to produce the world's foremost heat and corrosion resistant alloy—Nichrome!

But it takes more than the combining of nickel and chromium to produce the superior properties of genuine Nichrome—it requires certain exclusive D-H techniques combined with precise metallurgical checks and controls from furnace to spool, and the specialized experience of 46 years of continuous alloy research. These are the quality controls that have established Nichrome as the time-tested standard by which other alloys are measured.

Though there are other excellent nickel and chromium combinations, there is *only one* Nichrome—and it is made *only* by Driver-Harris. Thus Nichrome is at once the registered Trade Mark and symbol of service belonging wholly and solely to the Driver-Harris Company.

Nichrome is made only by

D/H

*Trade Mark Reg. U.S. Pat. Off.

Driver-Harris COMPANY

Stocked for the Coast Trade at: ANGUS-CAMPBELL, INC.

235-241 San Bruno Ave., San Francisco • 449 So. San Pedro St., Los Angeles • 2122-4th Ave., Seattle

Main Office and Plant: HARRISON, NEW JERSEY

ALL KINDS

of SMALL

TRANSFORMERS

—in the JEFFRIES line

Practically all your small transformer needs are supplied by the Complete Jeffries line. We have specialized for years in providing transformers to exactly match your requirements. If not in our regular line, we build to meet your specifications—in a hurry!!

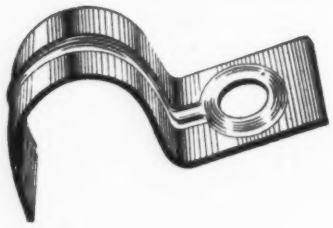
Minimize your voltage losses. Specify scattered transformers to eliminate duplicate conduit runs, and save on power costs.

JEFFRIES TRANSFORMER COMPANY

1710 E. 57th St. Los Angeles 11, Calif.

Minerallac

JIFFY CLIPS



Save time when hanging pipe, conduit, BX cable, etc., by using these strong ribbed JIFFY CLIPS. Only one bolt or screw is required. Their expert design and quality materials will assure long trouble-free service at a surprisingly low cost.

Available now in Cadmium plated steel or Everdur.

Ask Your Jobber for
JIFFY CLIPS

GEO. E. HONN CO.

Phone Sutter 7352

420 Market St. San Francisco, Cal.

● EDWIN FLEISCHMANN has resigned from the firm of Gilbert Associates Inc. and is going into business for himself at Palo Alto, Calif., as consulting engineer. Before coming West, Fleischmann did consulting work with the rate and research department of Gilbert Associates in New York, specializing in the field of utility rates, contracts, operating and management problems, cost studies and market analyses. During the war, he was deputy chief of the Fuel and Allocation Branch, OWU, in Washington. For 15 years prior to his association with Gilbert, he was with Niagara Hudson System, Niagara Electric Service Corp., and other Niagara concerns. His present address is Box 777, Palo Alto.

● STURGEON ELECTRIC CO., one of the pioneer electrical contracting firms of Denver, has recently been incorporated with the following officers: D. D. Sturgeon, president; Ralph E. Johnson, vice-president and general manager; George A. Mills, chief engineer; Clarence E. Trichka, superintendent; Ellis B. West, business manager.

● BAILEY METER CO. has announced additions and changes in its field engineering staff including the following in the West: Peter M. Harris has been assigned to the San Francisco branch, with headquarters in the Sharon Bldg.; Gilbert Peters has been sent to Denver: H. W. Hilker has been transferred from Cleveland headquarters to the Los Angeles office, 1709 W. 8th St.

● ORVILLE E. RANSOM has been appointed West Coast representative for Moe Brothers Mfg. Co., manufacturers of residential lighting equipment. With headquarters in San Francisco, he will cover the states of California, Oregon, Washington, Idaho and parts of Montana and Nevada. A native of Seattle, Ransom served as flight instructor in the U. S. Navy Air Corps.

● DON A. DAVIS has been made sales manager of Cannon Electric Development Co., Los Angeles, replacing William V. Brainard. Brainard resigned to form his own promotion service. Davis for several years has been chief engineering representative for Cannon, which makes electric connectors and specialty equipment.

● ELECTRIC MATERIAL CO., INC., has announced a change of address to Room 410, 693 Mission St., San Francisco 5.

● RYALL ELECTRIC SUPPLY CO., headed by James W. Ryall, has moved to a new building at 1160 Stout St., Denver.

● MINNEAPOLIS-HONEYWELL Regulator Co. has opened new headquarters in Los Angeles at 2840 E. Olympic Blvd., and will house there all divisions, heating and air conditioning controls, industrial, aeronautical, contractor, original equipment and jobber-dealer. Expansion of the office staff from seven to 24 in the last 18 months was reported by Gavin S. Younkin, branch manager.

● DESIGN FOR ARC WELDED STRUCTURES is a 15-minute color-sound motion picture produced by Herb Lamb Productions for Lincoln Electric Co. It is available in 16 mm. prints from Lincoln Electric, 12818 Coit Road, Cleveland 1; only charge is for transportation.

● GENERAL ELECTRIC is turning out small motors at a new plant in San Jose, Calif. Present facilities are in what was formerly a 48,000-sq. ft. indoor skating rink. A factory building on the same location is in the planning stage, but no dates have yet been announced.

● V. J. MORRIS Co., W. 513 Sprague, Spokane, electrical appliance dealer, soon will open a second retail outlet at W. 107 Ninth Ave. The new store is being remodeled and it will handle electrical appliances and giftwares.

● EDWARD S. SIEVERS, manufacturers' representative, has moved to 5171 Hollywood Blvd., Los Angeles 27. He represents Weston, Sola Electric, the States Co., Thermo-Electric Co., and Radio Frequency Labs Inc.

● ICEBERG refrigerated lockers will be distributed in Salt Lake City and Boise by the W. H. Bintz Co., 433 W. Third S., Salt Lake City. Paul J. DeVine is general manager of the Salt Lake firm.

● BENJAMIN ELECTRICAL MFG. Co. recently moved to 1136 Washington St., from 316 Commercial St., Los Angeles, according to George A. Hochenauer, Los Angeles representative.

● CHARLES S. SHRYOCK, formerly representative for Columbia Steel Co., has started his own wholesale business, Electrical Distributors Inc., 1314 Glendale Blvd., Los Angeles 26.

● C. J. LOMONTE Co., electrical engineers and contractors of Los Angeles, have moved from 3111 W. Sixth St., to 139 N. Western Avenue, Los Angeles 4.

● FLUORESCENT FIXTURES OF CALIFORNIA, manufacturer of the All-Brite line, has moved to larger quarters at 2779 Folsom St., San Francisco 10.

Memo To: Electrical Manufacturers And Their Western Representatives

Re: Manufacturers' Directory Issue of Electrical West, April, 1947

Buyers of electrical equipment in the Western states use this Directory throughout the year. With your cooperation we hope to make this next issue (the 15th Annual edition) the most complete and useful yet.

If you have not already filled out the questionnaire we have sent you requesting information about your Western sales outlets, won't you do so soon? We need this information to make the Directory accurate and up-to-date. We have more questionnaires if you've misplaced the first one or if we didn't send you one.

Thanks for your cooperation.

ELECTRICAL WEST

Spokesman for the most highly electrified section of the U. S.

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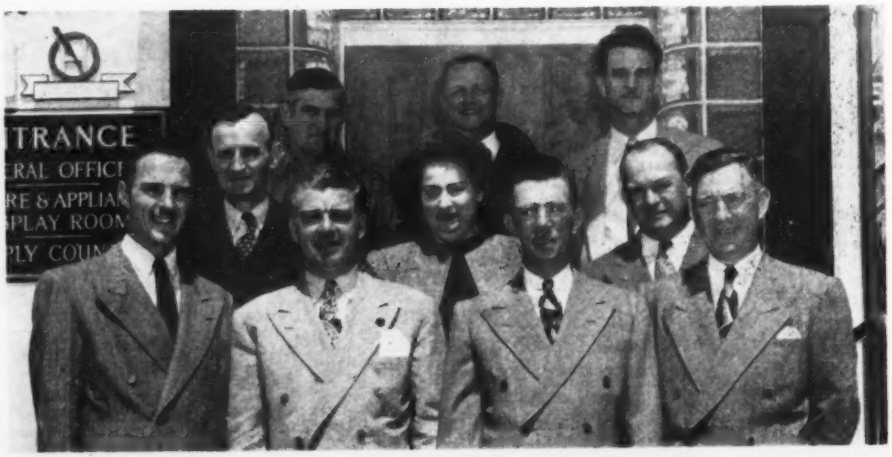
PROFILES *of the month*

Don Davis, new sales manager for Cannon Electric Development Co. of Los Angeles, succeeding William Brainard

Tom Widrig, Trumbull Electric Mfg.'s Northwest sales manager, who will head the Seattle Electric Club in 1947

Left: New officers of the California Municipal Utilities Assn. Top, Lauren W. Grayson, Riverside Light & Water Department, named to board of governors, and G. A. Baxter, Alameda Public Utilities Board, re-elected president. Lower, F. V. Frey, Pasadena Light & Power Department, secretary, and J. H. McCambridge, Burbank Public Service Department, vice-pres.

Below: Hollywood Wholesale Electric Co. department heads in front of the company's new quarters: left to right, front row, E. E. Hall, purchasing agent; W. S. Edwards, credit manager; H. S. N. Stultz, owner and general manager; J. E. Bissett, sales manager; second row, George Settles, service manager; Laura Lenz, accounting department manager; Ralph Tulp, appliance department manager; back row, Ted Chapin, merchandise manager; Rex Backus, lighting fixture department manager; B. G. Tilory, incandescent and fluorescent lamp department mgr.



Who says
"HORSES DON'T BET ON PEOPLE"?

A currently popular ditty tells us that horses don't bet on people because they have too much horse sense.

Whoa! Here in Northern California half a million "horses" are parlaying $160,000,000 on the people during the next two years.

You see, if Northern and Central California continue to gallop ahead in population and industry . . . and they surely will . . . more and more low-cost, reliable electric power will be required. To supply this ***future*** need P. G. and E. is working ***now*** on a $160,000,000, system-wide construction program which will put more than 500,000 additional horsepower to work in homes, factories and farms.

This is more than just a good bet . . . it's good horse sense. Because Northern California people and the many industries we serve have always been a ***winning combination.***

P·G·and E· PACIFIC GAS AND ELECTRIC COMPANY

EW—112-1246

The face that launched a thousand ships . . .

would miss the boat today!

Modern, postwar lighting installation De Pais Beauty Salon, Oakland, Calif.

Ancient Greece, citadel of classic glamor, fought ten years to rescue lovely Helen from her Trojan paramour. A headline story 3000 years ago—about the beauty of a woman with only crude unguents, oils and white lead powder in her kit. She probably wouldn't rate a whistle today.

Modern Helens enjoy benefits of scientific beauty culture far surpassing the primitive packs and pancakes of Athenian Aphrodites. Not the least of these benefits is *skillful lighting*—flattering to the customers and engineered to cash-register activity through the three Alphas of profit-building illumination:

ATTRACTION: to make Helen notice everything in the store or shop.

ATMOSPHERE: to give Helen that comfortable, first-class feeling about the store.

APPRAISAL: to help Helen realize that she is looking at the prettiest and best product on the market.

Get on the boat! Now is the time to launch profitable store and shop lighting jobs.

PACIFIC COAST ELECTRICAL ASSOCIATION

[illegible] SUTTER STREET, SAN FRANCISCO [illegible]

The microfilm contents of this roll were recorded as available.

Imperfections such as missing issues, missing pages, errors in

pagination have been verified with the bound volume after filming.